

The Chemical Age

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Notes and Comments

Exhibitions

THERE are some of us who go to the Royal Academy because it is the prevailing fashion to do so. For much the same reason we may go to exhibitions; we cannot show our ignorance of who and what was to be seen, for the topic may arise at an unexpected moment. Outstanding features are reviewed in the technical papers; advertisers invite us to visit them at their stands, where we are given literature and samples and offered the hospitality of an easy chair, glass and tobacco. But do we always make the most of this golden opportunity? Exhibitions are staged—or should be staged—to gather together authentic information under one roof and so make it generally useful to the industry or trade concerned. The casual visitor examines the exhibits and may pick up information which can be profitably utilised at some unexpected time. The discussions which ensue between the man "in the industry" and the man "serving the industry" draw out knowledge of mutual benefit. Problems and troubles are recited, proposals and recommendations are offered, and the industry ultimately profits; sometimes it is a gain in efficiency, at other times it is ways and means to effect what was hitherto difficult, uneconomic, or even considered impossible. At the stands intimate knowledge of plant and materials is at the disposal of everyone who passes through the turnstiles, and if you do not come away with new or fuller knowledge you are either unobservant, unsociable or uninterested.

Advantages and Drawbacks

OUR account of the Bakers' and the Chocolate exhibitions reminds us that twenty years ago an exhibition was an event—even transcending in popular imagination the parochial gathering or the annual efforts of the local amateur theatrical troupe. To-day it is no longer designed for popular education. It is the opportunity of the manufacturer to show his prospective customers what he has to offer in the way of machinery, equipment, goods or even processes. He may send forth his travellers who speak "with the tongues of men and of angels," but the flood of oratory may be unconvincing. He may send forth his literature; but how often does it reach the file—or even, be it whispered, the waste paper basket—unread. By verbal or written description alone much is lost, but if to verbal and written description, a visual demonstration be added, the difference in appeal is profound. That is the *raison d'être* of the modern industrial exhibition. Each industry has its own problems and very rarely collaborates with another industry to solve them. To walk round an exhibition

may only take an hour or two but it is less tiring than are many other ways of acquiring knowledge. We would therefore take this opportunity of urging the chemical industry to attend exhibitions of kindred industries and even of industries too remote in their application to be considered as kindred.

In nearly all industrial exhibitions there is, of course, one drawback to putting some goods on a stall for all to see. It is particularly the concern of makers of plant, and we know of some who will not support exhibitions on that account. Everything exhibited is seen also by competitors, who thus know perhaps more than is desirable of the details of new plant. When the whole position is analysed, however, there is less in this objection than would appear at first sight. All that is needed is to arrange the display with discretion. In any event, the manufacturer who does not show his goods cannot sell them, and in these days of intensive progress, no manufacturer can hope to continue in business if he is not continually bringing out something new.

Food Poisoning

IN his presidential address to the British Association, Sir Frederick Gowland Hopkins referred to the effect of very small quantities of foreign substances upon the functioning of the living cell. He there suggested that before these substances could have their observed effect there must be some element of structure in the entrant molecule adjusted to meet an aspect of molecular structure in the cell itself. There is here some similarity to the views of Langmuir on surface catalysis. This may be the explanation of an observation lately recorded by Dr. W. Clayton, chief chemist to Crosse and Blackwell, upon the peculiarity of fish absorbing arsenic from sea-water and yet being harmless as food. Prawns, in particular, are remarkable for their very high arsenical content, and yet they are harmless. This non-toxicity has been described as one of the most intriguing problems of the biochemist, and is said to be due to the formation of a compound of arsenic that is itself non-toxic, or to the protective effect of other ingredients. In other words, following Sir Frederick's views, either the arsenic is so combined that the particular free valency that could attack a cell is satisfied, or there may be present some harmless substance that combines with the free valency of the cell structure before the arsenic can do so. There is an analogous instance in the thermal decomposition of ammonia, for it has been found ("J. Soc. Chem. Ind.," 41, 114T) that whereas iron or iron oxide effect the decomposition of ammonia vigorously, iron pyrites and iron sulphide do not.

It is also interesting to record that aluminium is now considered to be a safe metal in which to store food. Housewives have been using aluminium utensils for many years and seem to have forestalled the chemists in their discovery. It is suggested that there is much to learn about the possible toxicity of tin, since tin is frequently used as a storage medium, whilst prolonged storage of tinned products has sometimes been found to lead to contamination. The danger of tin appears to lie with canned food of higher acid content, since asparagus (one of the most acid of food-stuffs) is frequently contaminated.

Evening Courses for Chemical Workers

WITH the approach of autumn many young workers in the chemical and allied industries are directing their attention to facilities offered by schools and colleges for learning the general principles of science. The zeal for knowledge displayed by these workers, who, after spending eight hours in the factory, are anxious to devote their spare time to study and to attendance at lecture and laboratory courses, merits encouragement from every educationalist. Whatever the underlying motive may be—cultural or material, aesthetic or economic—the fact remains that many of our schools and colleges of art, science and technology will be thronged with evening students within the next few weeks; in fact, the demand for part-time courses has reached such a pass that at some centres there will be considerable difficulty in accommodating the students.

But so long as education authorities continue to meet this demand so long will they be rendering a great service to the community; for, *ceteris paribus*, the young man who is employed in industry and who has the courage and the pertinacity to complete a systematic course of evening instruction, extending over five or more winter sessions, sometimes travelling many miles to and from the educational institution, is a better worker and a better citizen than the man who spends his adolescence in an aimless manner. Many men and women who obtained their technical training in this way are now playing a prominent part in the commercial, industrial and scientific life of the country.

Post-Advanced Instruction

IN 1931 a joint advisory committee, under the chairmanship of Alderman Edwin Thompson, of Liverpool, and representative of the Board of Education, local education authorities, technical colleges, and the Manchester and Liverpool sections of the Society of Chemical Industry and of the Institute of Chemistry, was set up with the object of arranging a scheme of evening courses of a post-advanced character in chemistry and chemical technology. As a result of the joint efforts of teachers, administrators, scientists, and technologists an attractive programme was prepared, and the courses, which were held in Liverpool, Manchester, and Widnes during the session 1932-33, proved highly successful. In the report presented to the advisory committee it was stated that upwards of 110 more post-graduate students had taken courses during 1932-33 than in former years. This happy result not only indicates that these courses supplied a real want but reflects great credit on the distinguished committee which initiated and developed the scheme. The courses to be provided at the same centres during the

coming session, particulars of which are now available, will be no less welcome than those offered last year. A series of lectures at the Liverpool Central Technical School by Dr. J. D. A. Johnson on modern syntheses and methods of synthesis, being a résumé of the more important work of the past ten years, is particularly attractive, whilst a course on the principles of costing as applied to the chemical industry, which is to be delivered at the Manchester College of Technology by members of the staff of Imperial Chemical Industries, Ltd., will be welcomed by many chemists who are engaged or are about to be engaged in the industry. That the advisory committee is doing useful work is evident; that it is anxious to do more is clearly indicated by the fact that the hon. secretary, Mr. P. E. Meadon, director of education for Lancashire, will be glad to receive suggestions.

The Trades Union Congress

THE deliberations of the Trades Union Congress this year were conducted in an atmosphere of eminent respectability and in general there is little to which we are urged to take vocal exception; provided, that is, that our silence be not construed as signifying consent. There is, however, one matter on which we feel impelled to comment and that is the demand approved by the General Council, but withdrawn in deference to the wishes of the Parliamentary Labour Party, that wage-earners have a right to representation on the board of the undertaking they serve. The resolution went on to say that "The Congress believes that this right should be exercised by adequate representation upon the board of management as a *necessary condition for efficient management*. Congress claims as a statutory right that 50 per cent. of the representation on managerial committees shall be accorded to the workers' nominees." The italics, in the passage quoted, are ours.

It is difficult to take seriously the suggestion that the direction of big business can only be efficient when placed in the hands of the labourers. There are many men occupying—perhaps encumbering is the better word—a seat on boards; they should not be there. If they could be removed there might be some improvement; but we do not think the established and reliable business of this country can be said to have come badly out of the world crisis that has wrecked so many. Nor do we think that the history of trade unionism during recent years is such as to give any confidence that even the leaders would be able to manage a business successfully to say nothing of the rank and file. Of course, we may be wrong; but the experience of Russia, where they have tried it, does not seem encouraging. For the management of any business there is required judgment, knowledge and capacity for leadership. Judgment must be based on experience. Knowledge cannot be acquired overnight. Leadership must be of quite another character than that of the political demagogue which serves for certain purposes. There must be on the board of any large company a number of men who have specialised in several forms of business life, technical, scientific, commercial, financial and so forth. There is no room for those who have only specialised in speech-making; there is less room still for those whose only qualification is that they can wheel a barrow or stoke a furnace. In that way lies disaster not only to the concerns, but to the workers themselves.

The Dyestuffs Industry

Report of the Import Duties Advisory Committee

A STATEMENT issued by the Treasury on September 7 announces that the Import Duties Advisory Committee has recommended that, while the licensing system for the import of dyestuffs should be continued, imported dyestuffs should be removed from the operation of the Import Duties Act. It has also been recommended that intermediates shall remain subject to tax.

ON December 7, 1932, the Chancellor of the Exchequer invited the Import Duties Advisory Committee to consider the position that will arise on the expiry of the Dyestuffs (Import Regulation) Act, 1920, and in particular to advise whether the interests of trade and industry in the United Kingdom, including those of users as well as makers, will best be served by (a) the continuance of the Act, and if so, for what period and under what conditions; or (b) the discontinuance of the Act, and if so, whether in that event imported dyestuffs should (i) be exempted from the general *ad valorem* duty imposed under the Import Duties Act, 1932, (ii) remain liable to the general *ad valorem* duty, or (iii) become liable to additional duties under the Import Duties Act, 1932, in addition to the general *ad valorem* duty.

The Present Position

In its report now issued (Command Paper 4411, H.M. Stationery Office, price 2d.) the Import Duties Advisory Committee points out that under the terms of the Dyestuffs (Import Regulation) Act, 1920, the import of all synthetic organic dyestuffs, colours and colouring matters, and all organic intermediate products used in the manufacture of any such dyestuffs, colours and colouring matters, is prohibited except under licence from the Board of Trade. Such dyestuffs as are imported under licence are now subject to the general *ad valorem* duty imposed by the Import Duties Act, 1932, and the same is true of the intermediate products imported under licence for actual use in the manufacture of dyestuffs. At the time of the preparation of its first report the Committee considered the question of the appropriate tariff regime to be applied to these two classes of goods, and came to the conclusion that, so long as the Dyestuffs (Import Regulation) Act remained in force, no useful purpose would be served by the imposition of additional duties upon them, and they have accordingly been left subject to the general *ad valorem* duty only. It should, however, be observed that certain intermediate products which may be used for purposes other than the manufacture of dyestuffs are included in the lists published by the Board of Trade as subject to duty under Part I of the Safeguarding of Industries Act, 1921. Consignments imported for such other purposes are chargeable with Key Industry duty and not with general *ad valorem* duty, and thus, in accordance with Section 1 (2) (a) of the Import Duties Act, were outside the purview of the Committee.

Representative Evidence

In embarking on this inquiry, the committee had before it the two reports, dated July 2, 1930 and October 25, 1932, respectively, of the Dyestuffs Industry Development Committee appointed by the Board of Trade under Section 2 (6) of the Act of 1920. As these reports had been accepted on all sides as authoritative statements of the facts as to the development of the synthetic dye-making industry in this country, and as to its present scope and scale of production, it appeared unnecessary to make any further inquiries on these matters, and the Committee therefore followed its usual practice of inviting parties likely to be interested to place their views before it. In this way it received submissions from the Colour Users' Association, the Association of British Chemical Manufacturers, Imperial Chemical Industries, Ltd., the Clayton Aniline Co., Ltd., the British Chemical and Dyestuffs Traders' Association, the National Federation of Associated Paint, Colour and Varnish Manufacturers, the British Colour Makers' Association, the Society of British Printing Ink Makers, the Wallpaper Manufacturers' Employers' Association, the Silk Association, the Joint Committee of Cotton Trade Organisations, and the Wool Textile Delegation.

The Colour Users' Association is representative of almost all the dye-using industries, with the textile trades predominant; and its existence and co-operation has contributed materially to the smooth working of the Act. This association declared itself opposed to the continuance of the Dyestuffs

(Import Regulation) Act, and also to the extension to the dyestuffs industry of any degree of tariff protection whatsoever. It is, however, evident that in enunciating this policy it does not speak with the same authority for all sections of the textile trades or for other using trades included within its membership. Thus the silk industry has through the Silk Association declared in favour of the continuance of appropriate protection for the manufacture of dyestuffs, and whilst the Wallpaper Manufacturers desire to see an end of all restrictions, the National Federation of Associated Paint, Colour and Varnish Manufacturers, which are constituents of the Colour Users' Association, are in favour of the continuance of the existing régime, which—it must be noted—applies to its own products also.

The Colour Users' Attitude

The Colour Users' have also drawn attention to the avowed intention in the Act that the expedient of import regulation should be applied only for a limited period of 10 years. In this connection, however, the time and the circumstances when the Dyestuffs (Import Regulation) Act was introduced should be borne in mind. The policy of import regulation constituted a notable exception to the general trade policy of the country. The situation has now undergone a radical change in that respect, and in the opinion of the Committee there appears to be no reason why the intention in 1920 should be regarded as excluding the dyestuffs industry from the general policy now in force, or necessarily depriving it of the protection given in varying measures to all other industries. If the choice of protective measures lay between restriction of imports and a system of import duties the colour users would prefer the present régime, as would the manufacturers.

In addition, the Colour Users' have drawn attention to a passage in the second report of the Dyestuffs Industry Development Committee, published in 1930. This committee state in paragraph 13 of that report that they "have no hesitation in saying that the main object of the Act has been achieved, and that a substantial dye-making industry has been built up and maintained, by reason of the Act, in this country" After the evidence which it has heard, however, the Import Duties Advisory Committee cannot draw the inference that the Development Committee, composed as it was of conflicting trade interests as well as of a strong element of independent opinion, unanimously recommended that the Act, having achieved its object, no longer served a useful purpose and should go out of existence. Although a substantial and virile dyestuffs industry has been built up in this country, it is still small compared with powerful organisations existing elsewhere, which could and might, if all barriers were removed, considerably weaken the position of the industry in this country and especially of the small dye-making concerns here that are not parties to any combination and are doing very useful service to the textile and other dye-using trades.

Influence of Prices

Whilst it may be true that high prices of dyestuffs in the early years of the Act may have been to some extent a handicap on the textile export trade, the Import Duties Advisory Committee thinks that this factor is of far less importance than other factors that it need not emphasise which brought about decline of export. As regards the present, it has been frankly stated that the users have no serious complaint as to the prices charged by the dyestuffs industry in comparison with the prices charged by continental makers, but they are apprehensive as to what may happen in the future, particularly in view of the formation of an international cartel. They base this apprehension on the fact that an over-all increase of dyestuff prices to the extent of 22½ per cent. occurred after the cartel came into being. It was, however, pointed out that this increase was no more than a return to the level from which prices had been voluntarily reduced by

the makers in the hope of getting more trade—a hope that turned out to be vain. The Committee is satisfied, however, that the increase has not resulted in an unreasonable profit to the makers.

The case submitted on behalf of the dye makers and those others who are in favour of a continuance of control was devoted mainly to an exposition of the advantages which the control has given to a nascent industry, and the Committee does not enlarge upon it in this report. It is admitted on all sides that the British dyestuffs industry has become an efficient one—in respect of both the quality and range of its output, though that range is still incomplete, and of the service which it offers to users—and has taken full and proper advantage of the protection afforded to it. There is, however, one aspect of this part of the case to which the committee specially refers as it is not one on which issue has been joined between the users and the producers. The Dyestuffs (Import Regulation) Act and the procedure which has grown up in its administration has led to the establishment of a considerable organisation of research. A notable achievement of this research has been the discovery of a range of dyestuffs for the dyeing of acetate silk, a group of colours in which the British have played a leading part.

Extension of Research

But research in dyestuffs is apt very rapidly and readily to extend beyond that field and to develop the opportunity and the habit of research in other fields of organic chemistry. It provides the ideal training ground from which to draw a body of technologists equipped to deal with the new scientific problems which arise daily in the course of development of modern industries. The Committee has no doubt that those responsible for the conduct of the industry are fully conscious of these considerations, and will continue and develop their research policy.

Passing from the main arguments advanced by the various parties, the Committee is glad to be able to record the consensus of opinion that the licensing system established by the Dyestuffs (Import Regulation) Act has been administered with great efficiency. The Dyestuffs Advisory Licensing Committee, it point out, has elaborated with the concurrence of the Board of Trade a system of regulation of imports which presents certain advantages over a system of protective duties: it enables the consumer to get non-competitive dyestuffs subject only to the general *ad valorem* duty; to the makers it gives the advantage that protection can be automatically applied to any extension of their production, a course that would be difficult under a system of duties, and it raises no question of a system of drawback, a consideration of great weight.

General Policy to Continue

In its recommendations the Import Duties Advisory Committee has therefore come very definitely to the conclusion that the general policy embodied in the Dyestuffs (Import Regulation) Act should be continued. It does not recommend any time limit, as it appears that the question whether, and if so when, the system should be terminated should be left entirely open.

Further, the Committee is of opinion that so far as dyestuffs (but not intermediate products) are concerned, consignments admitted under licence should be free of import duties. The issue of a licence for a dyestuff should normally mean that the dyestuff is essential for use in production both for the home trade and for export, and that the equivalent of that dyestuff is not procurable in this country at a reasonably competitive price or is not procurable at all. These are conditions in which, in regard to other commodities, the committee has been moved to recommend addition to the Free List. If it could recommend that only licensed dyestuffs should be added to the Free List it would do so, but since it has been advised that licensed dyestuffs are not "a class or description of goods" within the meaning of the Import Duties Act its recommendation is in form that all dyestuffs should be placed on the Free List.

As regards intermediates generally—apart from the special cases just noted—somewhat different considerations apply. At present, all the intermediate products of coal tar distillation used in the manufacture of dyestuffs are covered by the Dyestuffs (Import Regulation) Act, and may not be imported except under licence; and, when imported for such use, bear

the general *ad valorem* duty. Some of them are also used otherwise than for the manufacture of dyestuffs and are included in the lists of articles chargeable with duty under Part I of the Safeguarding of Industries Act of 1921 and therefore when so used are charged with Key Industry duty. The Committee does not therefore recommend any change in this position. No anomaly will result, because licences would not be issued in respect of dyestuffs of the kinds manufactured in this country from imported intermediates.

The Dyestuffs (Import Regulation) Act applies also to colours and colouring matters. These terms are held to describe such goods as lake pigments, artists' colours, printing inks, typewriter ribbons and coloured pencils—articles in which a dyestuff is incorporated with some medium of application. Some of them have been relieved of the prohibition by the issue of general licences, and the committee sees no reason for maintaining an import restriction on these goods and think that they can more appropriately be left to the operation of the Import Duties Act upon the more specific classes or descriptions of goods to which they respectively belong.

The Administration System

As regards administration, the Committee is of the opinion that the present system should continue with certain modifications. A licensing committee will be needed, and this should be constituted on the same principles of representation of interests as are laid down in the Dyestuffs (Import Regulation) Act, and with the same functions. The functions of the Development Committee constituted under the Dyestuffs (Import Regulation) Act should also be continued, and it would be an advantage if the body responsible for this work were constituted of the Licensing Committee with the addition, for the consideration of development questions only, of a certain number of persons representative of the textile industries, of the heavy chemical industry, of chemical science and of the Departments of State interested. In this connection the Committee thinks that the persons representative of chemical science on this additional panel should be nominated by the Department of Scientific and Industrial Research. Control of administration would naturally remain in the hands of the Board of Trade, who should appoint the Licensing Committee and its additional panel of members for the consideration of development questions.

Independent Authority

In concluding this report the Import Duties Advisory Committee thinks that the present regime, if permanently established, would meet with a readier acceptance on the part of the colour users, if means could be found to remove anxieties as to the possibility of exploitation. If some provision could be made whereby complaints by any responsible body of consumers as to exploitation in respect of dyestuffs and intermediates generally or of a particular class or classes thereof could be addressed to an independent authority, who would have powers of investigation and whose findings would be made public, a substantial reason for the opposition of the colour users to a continuance of the present system should be removed, and it would meet with general acceptance if the duty of investigation were entrusted to the Import Duties Advisory Committee. If requested to do so, the Committee is prepared to undertake this task.

Organotherapeutic Preparations

Control of Manufacture and Sale in Poland

THE Polish Minister of Public Welfare has issued an order concerning the manufacture, labelling, sale and inspection of organotherapeutic preparations in the Republic of Poland, and defines the methods whereby foreign preparations of this nature may be marketed in Poland. Permits will be issued only to foreign manufacturers who have a representative in Poland, such representative to be responsible for the quality of the foreign product. Labels must be in the Polish language, with the exception of the name of the preparation, which must be in Latin. For imported preparations the name of the representative in Poland must be given on the label. All other data on imported as well as domestic preparations must be in Polish, except the name.

Lead-Lined Plant and Chemical Stoneware

Closer Co-operation Between Users and Makers

AN investigation has recently been made by the British Chemical Plant Manufacturers' Association in regard to the capabilities of British firms to supply products which compare favourably with the best obtainable from foreign sources. In a letter to THE CHEMICAL AGE (January 9, 1932), Mr. J. Davidson Pratt, secretary of the Association, in advocating a "Buy British" policy, stated that "speaking generally, there is little, if any need, for users of chemical plant to go abroad for their requirements." This statement was challenged by "Chemical Manufacturer," an anonymous correspondent, who complained in THE CHEMICAL AGE of March, 12, 1932, regarding the unsatisfactory nature of the lead-lined plant and chemical stoneware obtained from British firms. Ensuing letters from firms engaged in the production of lead linings and stoneware might have been regarded as sufficient to disprove the above contentions, but since they could all be challenged as *ex-parte*, the British Chemical Plant Manufacturers' Association decided to investigate the whole subject. Through the Association of British Chemical Manufacturers, the view of chemical manufacturers who were actual users of British lead-lined plant and chemical stoneware were collected and a joint meeting of makers and users in the two Associations was convened to consider the collated observations. A frank exchange of views took place which both parties admitted to be of great value in indicating how, by closer co-operation in the design and supply of the plant, difficulties which had arisen in the past could be overcome.

Lead-Linings

As regards lead-linings, it was agreed that trouble had arisen owing to poor application of the lining on the plant made some years ago when the process of homogeneous lining was new in this country, but that great progress had been made in recent years, and there were now a number of firms capable of supplying linings equal to the best foreign product. There should, in modern plant, be no possibility of liquid penetrating between the lining and the outer casting. Emphasis was laid on the point that sheet lead attached to a vessel does not constitute homogeneous lead-lining. Pin-holes are a likely cause of trouble; while generally speaking, they should not exist in the most modern linings. It would, nevertheless, be a wise precaution for users of new homogeneously lead-lined plant to examine the lining minutely after the plant has been in operation for a period with a view to detecting and repairing internal pin-holes which could not have been detected on the unused plant, but which had worked through to the surface during use.

Makers and users agreed that when a homogeneously lined unit was required, it should be designed from the commencement with this aim in view, namely, that it was to be lined. The parts which would prove difficult to line could then be eliminated or modified. It was essential that all surfaces should be rubbed down to a high degree of smoothness before the lining process was commenced. The inadvisability of introducing riveting into a vessel which was to be lead-lined was also emphasised. For these reasons, the plant manufacturers urged the users to approach them when the plant was in the design stage and let them suggest where modification might be introduced to make the lining procedure easier and therefore more satisfactory.

The Comparative Value of Spraying

On a question raised as to the comparative value of spraying, the opinion was expressed that, by the very nature of the process, the lead lost some of its valuable characteristics in that spraying yielded layers of lead particles instead of a solid mass of lead. Spraying was adjudged to be excellent in use as a type of paint, but for the internal lining of chemical plant, where corrosive products were used, it could not be expected to give as satisfactory results as a lead-lining on account of porosity. This limitation should be recognised.

The question of the supply of homogeneously lead-lined coils received attention, and one manufacturer exhibited photographs of grid type heaters in homogeneously lead-lined metal which were proving satisfactory. Another manufacturer admitted that he could not give an unqualified guarantee in

respect of lead-lined coils proper when used at elevated temperatures and in the presence of corrosive materials; on the other hand, such coils were as good as lead piping under these conditions, while at the same time being stronger. The main conclusion reached was that homogeneously lead-lined plant could now be produced as satisfactorily in this country as anywhere, while the main recommendations were (a) that the users should co-operate with the makers at an early stage in the preparation of the design; and (b) that the plant manufacturers should collaborate in the preparation and issue of data on the mechanical, conductive and other properties which would be helpful to the users who were considering the employment and design of homogeneously lead-lined plant.

Chemical Stoneware

The position in regard to chemical stoneware has changed enormously in the course of the last 18 months, due to the progressive action of one or two firms which have taken the subject up on scientific lines. Practically any type of chemical stoneware can now be obtained in this country and users in close touch with recent developments who had tested the latest British products, were agreed that they were in no way inferior to the best foreign stoneware. In regard to heating up the stoneware, which must always be done with great care, since brittleness is a characteristic inherent in all stoneware, it is claimed that in many respects the British product is superior to the foreign, and that if appropriate lagging is provided and the heating is done slowly, it is possible to reach and maintain a temperature of 220° C. The only deficiency is in regard to stoneware pumps where the makers have wisely deferred putting a pump on the market until they were confident of its success.

Mention was made of foreign propaganda to the effect that it would never be possible to get good British stoneware because manufacturers in this country had not supplies of the proper clay available. This is not the case. The raw material for a piece of chemical stoneware has to be collected from various parts of the world and blended, and all of these sources are equally available to British as to foreign makers.

The makers admitted the criticism that the British product compares unfavourably with the foreign in its finish, but contended that the appearance of the glaze on chemical stoneware had no real significance; the glaze did not make the vessel non-porous; in fact, the glaze was frequently more porous than the stoneware itself, and the porosity test was a better guide to the user than the appearance of the glaze. Furthermore, many of the highly finished foreign units contained objectionable amounts of iron in the glaze layer.

Steps Towards Standardisation

The effect of porosity was emphasised and it was submitted that most troubles were due to the use of a too porous grade for the purpose to which a unit was put. Chemical stoneware should in no case have a porosity greater than 1 per cent. and a much lower figure could be obtained when necessary. As in the case of lead-linings, the makers urged the need for co-operation with the users in the design of the plant.

The main conclusion was that the British makers of chemical stoneware had made great progress in the last year or so, and that there was every hope that in the near future, this country would be able to meet all requirements. The main recommendations were (a) that the British Standards Institution should be asked to undertake the standardisation of stoneware sockets and tapered flanges; and (b) that the standardisation of the terms used for the designation of the properties of stoneware and the tests to be used in the determination of these properties should also be undertaken. As an outcome a committee of the British Standards Institution is now being appointed under the chairmanship of Mr. J. Arthur J. Reavell, to investigate the standardisation of the items and tests in question.

The British Chemical Plant Manufacturers' Association and the Association of British Chemical Manufacturers are so satisfied with the outcome of this investigation that they propose to apply this procedure to any similar problems that may arise in future.

Letters to the Editor

The Editor welcomes expression of opinion and fact from responsible persons for publication in these columns. Signed letters are, of course, preferred, but where a desire for anonymity is indicated this will invariably be respected. From time to time letters containing useful ideas and suggestions have been received, signed with a nom-de-plume and giving no information as to their origin. Correspondence cannot be published in THE CHEMICAL AGE unless its authorship is revealed to the Editor.

Displaced German Scholars

SIR,—The letter by Dr. Stern in THE CHEMICAL AGE of September 9, demands a reply. Those who know the German mentality will realise that a German will not go forth to specify British remedies, British health resorts and British machinery, even if we admit him to this country after being expelled from his own. "Once a German always a German," is at the same time a true saying and a tribute to Teutonic patriotism. This, however, is a small point. The greatest fallacy underlying Dr. Stern's letter is the imputation that the English teacher cannot attract pupils and that pupils will only come to English Universities because they have engaged some eminent German teachers. Have we then no men of science with international reputations? In the years before the war, we bought German apparatus and German chemicals, because we had no factories in England making them of equal or even comparable quality, to mention only two instances; the British product is now equal or superior to the German product, and we no longer find it necessary to go to Germany for these things. It is time that we had finished with this inferiority complex. The sentiments expressed in Dr. Stern's last sentence are undoubtedly gentlemanly, but the British Empire was not built by men who peacefully turned the other cheek.—Yours faithfully,

"A BRITISH CHEMIST," D.Sc.

London.

Charcoal Burning versus Wood Distillation

SIR,—The idea of utilising charcoal in gas producers mounted on motor vehicles has once more received prominence in photographs published recently in "The Times" concerning the lorries of the Koala Producer Gas Co. In a leader in THE CHEMICAL AGE, September 2, there is asked the relevant question "Can we bring back the industry of charcoal burning by finding other outlets for its products?"

To consider firstly the idea of making charcoal for use in producers it may be stated at once that there is nothing new in a charcoal-burning lorry. France and Germany have proved the suitability of charcoal gas for the internal combustion engine of the stationary type; but it has been left to British engineers to introduce and and perfect with astonishing success the charcoal-burning lorry. In extensive trials in this country, and in the tropical areas of Africa and Australia, the four and six wheeled lorries of Guy Motors, Ltd., have satisfied all the requirements of bodies such as the British Empire Cotton Growers' Association and the Mechanical Transport Section of the Australian Government. The writer has had the opportunity of inspecting a six-wheeler of this concern, and has referred to it in the "Transactions of the Institution of the Chemical Engineers," 1930, 8, 144, and elsewhere. The Tulloch-Reading charcoal producer has proved conclusively that even in tropical areas where petrol can be bought as low as 2s. per gal. there can be effected a saving of 88 per cent. fuel costs by using charcoal gas. And there can be nothing more conclusive than the report of the Producer Gas Sub-Committee in Australia which ends with the statement that charcoal is an economical alternative to gasoline, especially in inland areas where imported gasoline is yet more expensive, while wood waste for conversion into charcoal is cheap and plentiful.

Far more difficult it is to answer the question of whether it would be feasible to revive the charcoal industry in this country. There have been three types of processes for the conversion of wood waste into charcoal all of which are alive to various extents in Europe and America, and which have been tried out by British concerns. Charcoal burning is the first—and was indeed the first chemical industry in existence. No plant is required for this operation; no maintenance charges and no labour increase production costs, and there is no competition in the market. And in spite of all efficient carbonising plant and distillation units installed by the wood distiller, the charcoal burner has appeared in greater

numbers this last year in America and Canada, selling his product at cut-throat prices. The meiler is a rare sight in England now-a-days, owing to lack of raw material: the kiln is a modified type of meiler and is used only in Michigan; and it is quite certain that neither of these crude plants exceed in efficiency such portable charcoal plants as those formerly manufactured by Crossley Bros., Ltd., of Manchester.

The second type of charcoal plant is designed to deal with small wood waste from the timber yards and wood-working plants. At Swinton, Manchester, an interesting experiment was carried out by one of such concerns some time ago. A mild steel retort of the "fusion rotary type" was installed for carbonising clippings and sawdust from the wood-turning shop, the retort being mounted horizontally and provided with four internal "breakers" of the four vane type. The latter prevented the formation of a semi-carbonised layer on the inner walls of a retort. From a waste material which entailed expense in carrying it to a dump there was obtained settled tar, pyroligneous acid (which was converted to iron liquor), and charcoal. This example is the most recent of a large number of attempts to convert small wood waste into charcoal, the only other rotary retorts in existence being those at the Ford Motor Works, at Iron Mountain.

The third and final class of charcoal producing plant is the "wood distillery," which prepares a variety of liquid products, all of which meet with intense competition. Methanol of the synthetic type, acetic acid from acetylene and from alcohol by catalytic oxidation, acetone from the acetone-butyl alcohol fermentation process, all of these have combined to disturb the life of the wood distiller. He has only his tar, about which he has not yet said the last word, his methylating media and solvents of the methyl-acetone type, and there is his charcoal. But the latter has to bear a fair proportion of production costs, and since it is of high-grade consistency, the price is too high for any use as fuel. The three or four remaining distillers in this country are no better off than their American brethren. For although they are not harassed by the increasing activities of the farmer charcoal-burners, yet foreign charcoal is offered on the market at a more than competition price. The downward curve of American production during the last few years indicates that unless renewed efforts are made the industry will have disappeared in ten years time. But the newer plants at Kingsport, Crossett, and elsewhere, are fighting competition successfully and are situated in the South. America has overcome her lack of wood supplies by moving South.

In this country the future is not likely to see any new wood distillation plants. The few existing ones will continue to keep going so long as there is any wood to distil, for our manufacturers have been as far-sighted as those of other countries in selling their products in the form favoured by purchasers. Wood tar oils, pitches, solvents, and a high-grade charcoal are available. Charcoal burning for the production of inferior grades of charcoal as a fuel is unlikely to revive in any appreciable proportions, for the meiler method is too slow and far from efficient as far as yields are concerned, and out of the vast patent literature concerning modifications of the meiler, or alternatives for making charcoal alone, there is little to be recommended for large scale work. It may be argued that more research is still necessary. But almost every conceivable avenue has been explored—and a German concern squandered two millions in vain.—Yours faithfully,

M. SCHOFIELD.

Wolverhampton.

Sulphur from Gas Purification

SIR,—Your correspondent "Proteus" is justifiably anxious to uphold the good name of the gas industry; but I feel that in this respect he is "as one who beateth the air," since I feel sure you had no intention in your editorial of suggesting otherwise. Thomas Duxbury and Co., on the other hand, are

naturally anxious that nothing should happen to disturb the existing order wherein gas is purified from sulphuretted hydrogen by means of oxide of iron. The total output of sulphur could not be materially increased by changing the process, so far as gasworks are concerned, but the value of sulphur could be greatly enhanced by producing in one process sulphur of so high a quality that it is better than the American rock sulphur. There is surely a distinct gain if sulphur, now sold for making sulphuric acid at perhaps £3 per ton, should be converted directly into a product worth £6 to £8 per ton, according to whether it were distilled sulphur or roll sulphur. The difference lies in the enhanced value of the improved article.

Concerning the increase of the total quantity of sulphur produced, it is not definitive that sulphur produced or recovered by the Thylox process may not be actually made profitably when the much lower costs of coke oven operation are considered rather than the higher gasworks costs. The advantages of sulphur-free gas for open hearth furnace, may yet cause the South Yorkshire Gas Grid Company to purify its gas in bulk, and there seems nothing to stop sulphur recovery at many coke oven plants that sell gas in bulk. I feel, therefore, that your editorial comments are reasonable.

Thomas Duxbury and Co. believe that the Thylox plants in the Ruhr are experimental. The first plant at Ilseider Hütte has a capacity of 8½ million cu. ft. of gas per day. The second plant at Ewald has, I believe, the same capacity, whilst a third plant, owned by the Ruhr-Gas A.G., is being erected at the Minister Stein cooking plant, having a capacity of 20 million cu. ft. per day, with provision for extension to 32 million cu. ft. per day. This could hardly be termed experimental. There is clearly a much stronger case to be made for the direct production of sulphur in its most valuable commercial form, than for its direct conversion into the acid

radicle of sulphate of ammonia, a problem over which so much money and time has been spent fruitlessly in the past.

I may add that in putting these considerations forward I have no particular axe to grind, but consider that they may be of interest to your readers as evidence of the genesis and growth of a new process, which I personally believe will make an important contribution to the technique of the recovery of sulphur from coal gas.—Yours faithfully,

G. E. FOXWELL, D.Sc., F.Inst.P., F.Inst.F.
Consultant.

Asphalte Workers' Conditions

SIR,—The attention of the Natural Asphalte Mine-Owners and Manufacturers Council has been called to a conference to the asphalte industry in THE CHEMICAL AGE of September 2, wherein it is stated that the Northern Asphalte Workers' Union have expressed the opinion that the operatives are not allowed the necessary time in which to produce a high standard of workmanship. As the Council's name is associated with the comments passed by the Union, I have been instructed to point out that the work being carried out with the Council's Standardised Asphalte by companies who are its members, is laid under conditions of labour which permit conscientious work to be done. If anyone responsible for specification or any professional body desiring further assurance on this matter will write to me, I shall be happy to supply additional information.—Yours faithfully,

G. J. HANCOCK.
Secretary, Natural Asphalte Mine-Owners
and Manufacturers' Council.

Terminal House,
Grosvenor Gardens, S.W.1.

New Knowledge on Iron and Steel

Selected Papers at the Autumn Meeting of the Iron and Steel Institute

A METHOD for the electrolytic extraction of slag from iron and carbon steel was described by R. Treje and Professor C. Penedicks, of the Metallografiska Institutet, Stockholm, on the occasion of the autumn meeting of the Iron and Steel Institute, which was held at Sheffield, from Tuesday to Friday of this week. In this method the slag residue obtained is uncontaminated by any iron hydroxide or basic iron salts. In the case of low carbon contents, the residue may be directly examined under the microscope. In the case of higher carbon contents the residue contains also cementite. This is, however, removed by using a suitable electromagnet. When strongly magnetic slag substances occur, such as sulphides, which are attracted by the magnetic field, the separation may be brought about in a solution possessing a suitable magnetic susceptibility ($MnCl_2$).

Examination of Slag Residues

The electrolysis is performed in a vessel divided into two by a diaphragm. The iron specimen—surrounded by a collodion bag for collecting the slag and which is carried by a floating wooden ring—forms the anode in a bromide solution containing sodium citrate; the cathode consists of a copper plate in $CuSO_4$ solution. This arrangement and choice of electrolytes, on the one hand, prevents any formation of oxygen gas on the anode—which would cause the liquid in the collodion bag to become acid and consequently attack the slag—and, on the other hand, avoids any hydrogen formation on the cathode—which would render the liquid there alkaline, resulting in the precipitation of hydroxides, which would contaminate the slag. The slag residue obtained is collected by centrifuging in a graduated tube, in which its (loose) volume may be read directly—after purification from small quantities of metallic iron. The slag volume per unit of weight obtained in this manner may be regarded as a characteristic of the material. The slag residue obtained may be directly subjected to microscopical as well as to chemical analysis.

The microscopical examination of the slag residue forms a valuable complement to the ordinary microscopy on a

polished surface, and often provides data characterising the material. Thus, in Armco iron, partly deoxidised with aluminium, well-crystallised octahedra of iron aluminate, that is, spinel, were discovered—a mineral not previously observed as a slag inclusion in common steels. Good agreement has been found between the results obtained from the quantitative chemical analysis and those which might be anticipated from a knowledge of the equilibrium conditions. Here, microchemical methods were found advantageous in considerably shortening the time required for the analysis and, particularly, for the electrolysis. The oxygen contents calculated from the quantitative slag composition were also found to tally well with those obtained from direct determinations using the vacuum extraction method. In an analogous way the quantitative recovery of sulphur was checked.

Thermal Conductivity of Iron

The thermal conductivity of wrought iron, steel, malleable cast iron and cast iron was reported upon by J. W. Donaldson, D.Sc., who presented results for a wrought iron, five carbon steels, a blackheart and a whiteheart malleable cast iron, five special cast irons, including silal and microsilal cast irons, and three cast irons of varying phosphorous contents. The consideration of the data from these investigations leads to certain conclusions. In the case of the wrought iron and the steels they are more or less definite, but difficulty, however, is experienced in forming definite conclusions regarding the malleable and other cast irons. Owing to the complex nature of these alloys and the formation of free carbon, either as temper carbon or as fine or coarse flake graphite, certain factors are introduced which require further investigation. It is concluded, however, that the thermal conductivity of wrought iron is approximately 0.175 cal. per cm. per sec. at 100° C., and decreases with increasing temperature, whilst the thermal conductivity of steel decreases with the carbon content, a value of 0.160 cal. per cm. per sec. being obtained for a 0.10 per cent. carbon steel and 0.117 cal. per cm. per sec. for a 1.00 per cent. carbon steel.

The falling-off in thermal conductivity with increasing carbon content is said to result from the influence which the carbon has on the structure in producing relative amounts of ferrite, pearlite and cementite for data indicates that the thermal conductivity of ferrite is higher than the value of 0.174 cal. per cm. per sec. hitherto adopted, and that pearlite has a thermal conductivity of approximately 0.124 cal. per cm. per sec.

Blackheart malleable iron, with a structure of ferrite, temper carbon and a small proportion of pearlite, has a thermal conductivity of 0.150 cal. per cm. per sec. at 100° C., and whiteheart malleable iron, with a structure of pearlite, temper carbon and a small proportion of ferrite, a thermal conductivity of 0.115 cal. per cm. per sec. at a similar temperature. The influence of silicon is to lower the thermal conductivity of all iron alloys. Its influence is most marked in cast iron, where the thermal conductivity decreases rapidly with an increase in the silicon content. With over 2 per cent. of silicon the falling-off in conductivity is reduced considerably, owing to the formation of a ferrite structure. The influence of phosphorus is to produce a slight decrease in the thermal conductivity of grey cast iron.

Tin as Impurity in Mild Steel

The effect of tin as an impurity in mild steels was the subject of a contribution by Professor J. H. Andrew, D.Sc., and J. B. Peile, B.Sc., of the Department of Metallurgy, Sheffield University. The research was restricted to the investigation of mild steels containing 0.3 per cent. of carbon and less, to which varying percentages of tin were added up to a maximum of 0.6 per cent. As a result of mechanical tests on these steels after a variety of heat treatments, it is possible to conclude that even 0.05 per cent. of tin impairs the resistance of these steels to shock stresses; but the effect is not pronounced until the tin content exceeds 0.2 per cent. In all cases the effect can be modified by suitable heat treatment. The way in which the toughness of these steels depends on the tempering temperature and on the rate of cooling after tempering is associated with the well-known phenomenon of "temper-brittleness."

Properties Influenced by Pickling

Effects of pickling on the properties of carbon steels were described by Ian G. Slater, M.Sc., Ph.D., Birmingham University, who studied the magnitude of the embrittling action produced in medium and high-carbon steel wires, on immersion in mineral acids of various concentrations and at different temperatures, by means of a simple torsion test. In the course of this work it was found that rapid embrittlement ensues immediately the wires are immersed in the acid and that the rate of deterioration increases with the acid concentration and the temperature. Hard-drawn wire, particularly in the larger gauges, is extremely susceptible to the embrittling effects. Deterioration proceeds at a less rapid rate when an inhibitor such as flour or yeast is added to the pickle. The temporary nature of the embrittlement is shown in the recovery tests at room and elevated temperatures, the rate of recovery rapidly increasing with the temperature. There is also evidence that, under certain conditions, steel wires on pickling may undergo appreciable damage of a permanent nature. Tensile tests showed that the properties of steels of the higher carbon contents undergo the greatest modification after pickling; the percentage reduction of area is particularly reduced and there is a decrease in the percentage elongation. A slight increase in the tensile strength was noted in all pickled specimens. Hardness determinations, using the Brinell method, showed a slight increase in the Brinell hardness after electrolytic pickling, but when examined by an impact hardness test, all samples after treatment were found to be definitely softer.

Effect of Hydrogen on Steel

A study of the effect on various steels of hydrogen at high pressures and temperatures, as described by N. P. Inglis, Ph.D., and W. Andrews, B.Met., has resulted in much data being obtained regarding the action of hydrogen, at 250 atm. and temperatures up to 500° C., on most of the generally used steels. The principal conclusion which have arisen from this work is that at high pressures hydrogen will attack steel at much lower temperatures than those causing attack at normal pressure. In the first stage of the attack the steel

absorbs hydrogen, and this will cause embrittlement even though no decarbonisation or disintegration has occurred. At this stage the steel can be restored to its original state of ductility by a suitable heat treatment to drive off the hydrogen. In the later stages of attack the steel becomes decarburised and fissured, with consequent very severe loss in strength and ductility. The factors which determine the degree of attack are (a) temperature, (b) pressure, (c) stress, (d) composition of the steel, and (e) structure of the steel. In any one steel the critical conditions giving rise to attack vary according to the structural conditions of the steel, that is, according to the heat treatment. The limiting temperature giving rise to attack on mild steel may vary 50° to 100° C., depending on the precise structural condition. A large thick-walled vessel, in which the desirable structural condition cannot be attained, may be attacked at temperatures as low as 200° C., but smaller vessels in the same composition can be heat-treated to give satisfactory resistance at 200° C. Chromium-nickel austenitic steels are not disintegrated by hydrogen at 250 atm. and temperatures up to 450° C., but these steels absorb large quantities of hydrogen under these conditions and consequently suffer severe embrittlement.

Cause of Mitcham Explosion

Home Office Report

AN escape of boiling methylated spirit is stated, in a Home Office report issued on September 14, to have been the cause of the explosion on March 30, at the chemical works of W. J. Bush and Co., Ltd., at Mitcham. A boy was killed and a whole row of small houses, near the factory, was very badly damaged. "The primary cause of the accident was an escape of alcohol from a leaking blank flange at the back of the still used for the recovery of methylated spirit." At the back of the still, at a point where there had previously been a pipe connection, there was a blank flange consisting of two 8 in. discs of lead and copper, bolted in position over the 2½ in. opening by six ½ in. gunmetal bolts, an asbestos disc being placed between the surface of the still and the blanking discs.

Examination of the blank flange at the back of still at which the leak had occurred showed that one of the bolts securing it to the still had broken, and from the appearance of the fracture it seemed likely that the breakage was due to the bolt being over-tightened when placed in position. The hot liquid, leaking to the ground, would have given off what was described by witnesses as fog or fumes, and which, associated with the air, would be explosive.

The building must have been rapidly filled with an explosive mixture of air with alcohol vapour and fumes only awaiting ignition to cause a violent explosion. Though it is possible that the fire of the factory's steam boiler ignited the mixture, it is more probable that it was ignited by a gas flame or fire in one of the houses in Belgrave Road.

The report commends two of the works staff, Mr. Chaplin and Mr. Knowles, for their presence of mind and intelligent carrying out of instructions designed to avert accident. The report recommends that new regulations should be brought in, stills used for distilling inflammable liquid should be examined at least once a year, arrangements should be made for preventing the possibility of leakage due to the fracture of a glass gauge, all electrical fittings should be flame-proof, and valves and switches should be placed at an adequate distance from the still.

Why the Price of Calcutta Shellac Rose

THE recent increase in price of shellac at Calcutta is attributed by export firms to a larger demand for the product from the United States. There are no reliable figures showing stocks of shellac on hand at Calcutta, but it is reported that stocks have been reduced considerably since the early part of May. Cable reports received by shellac operators in Calcutta indicate that more shellac is being used in the United States. Most of the shellac exporters believe that the present buying by American firms represents an increase in the actual requirements for shellac and that the fairly heavy shipments which are now being made will move into consumption in the United States at an early date.

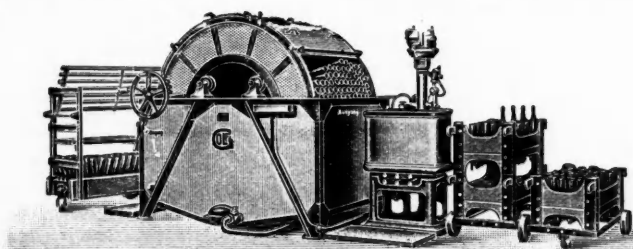
Bottle Soaking, Washing and Rinsing Equipment with Some Novel Features

BOTTLE washing has now become an important feature in works where proprietary preparations are manufactured and packed. In this connection the equipment supplied by John C. Carlson, sole importer for Seitz-Works, Rhineland, is of special interest, as the Seitz' "Polfram" bottle washing and rinsing machine uses upright brushes instead of horizontal brushes, and thereby effects a greater degree of efficiency.

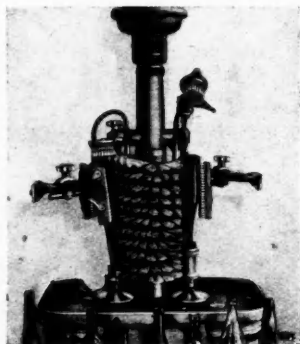
In this machine the mechanical brushing of the bottle is combined with a very intensive rinsing. Whilst the bottle is being brushed the dirty water runs out continually in a spiral column, so that it is impossible for the interior of the bottle to be brushed with dirty or greasy soaking water, as in

brushes, and the bottom by other brushes, which simultaneously rinse the outside of the bottles as they are constructed with an outlet for water. One workman only is sufficient to operate the machine, and his work consists of putting on the bottles and removing them. Working is simple and not tiresome; neither does the attendant get wet. The power required amounts to only $\frac{1}{4}$ h.p. and the water consumption is only 50 to 100 gallons per 1,000 bottles. The output of the machine is up to 1,500 bottles per hour, according to shape and size.

The "Golf" bottle soaking apparatus, which is also illustrated, is a valuable supplement to the bottle washing

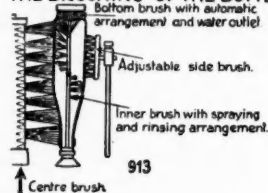


A Typical Installation showing the "Golf" Soaking Apparatus, the "Polfram" Washing and Rinsing Machine and Bottle Carriers.



General Arrangement of Brushes.

THE BRUSHING OF THE BOTTLES



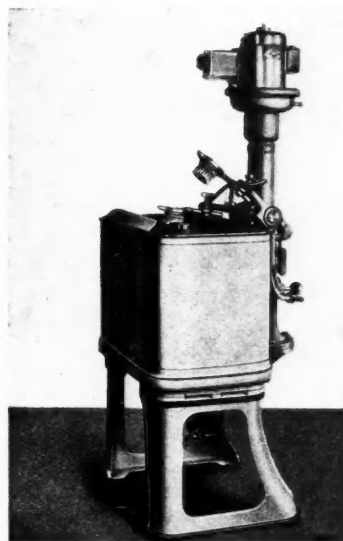
913

THE AUTOMATIC BOTTOM BRUSH ARRANGEMENT

As soon as bottle 2, after being cleaned, is lifted up bottom brush 1 falls down automatically (with bottle 1) brush 2. Therefore the attendant has both hands free to handle the bottles. This arrangement is perfectly responsible for the working speed of the machine.



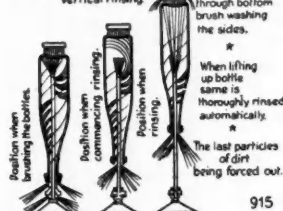
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The Seitz' "Polfram" Bottle Washing and Rinsing Machine.

THE RINSING OF THE BOTTLES.

Please note advantageous vertical rinsing.



915

machines which are provided with horizontal brushes. A special feature is the practical bottom brush, which need not be touched by the operator, being applied and removed from the bottle automatically. This brush also regulates the effective rinsing, so that the bottle whilst being removed from the brushes is rinsed with a strong jet of water until the last moment. This eliminates the necessity of a special rinsing valve, on which the bottle has to be placed after being brushed, as is the case with a machine having horizontal brushes.

By reference to the accompanying illustrations it will be seen that the cleaning of the inside of the bottles is effected by two vertical brushes from each of which a strong jet of water is projected. The outside of the bottle is cleaned by the large centre brush, together with the adjustable side

and rinsing machine, for a well-soaked bottle which has already been freed from impurities and labels that were adhering to it can be washed much better and quicker than a bottle which has not previously been soaked. Although this apparatus requires little space it contains an exceptional volume of water, and accommodates a large number of bottles at a time. The bottles as placed in the soaking apparatus are moved automatically without power, and are only filled when underneath the surface of the water, so that floating dirt and substance containing grease cannot get inside them. All such floating substances are removed continuously by way of a special outlet. Soaking can be done in water at any temperature and the consumption of steam and water is surprisingly small.

British Overseas Chemical Trade in August

Total Volume of Trade Greater than in July

Exports of chemicals, drugs, dyes and colours during August were valued at £1,416,191, compared with £1,345,504 during July, and £1,433,328 for August, 1932. Imports amounted to £891,666, compared with £768,336 during July, and £824,779 in August, 1932. Re-exports totalled £48,419, compared with £34,029 a year ago.

	Quantities.		Value.			Quantities.		Value.	
	Month ended August 31. 1932.	1933.	Month ended August 31. 1932. £	1933. £		Month ended August 31. 1932.	1933.	Month ended August 31. 1932. £	1933. £
Imports									
Acetic Anhydride .. cwt.	—	756	2	1,984	Tar Oil, Creosote Oil, etc.) .. gal.	1,880,844	1,576,770	34,065	22,255
Acid, Acetic .. tons	505	10,201	16,846	15,073	Other Sorts .. cwt.	12,373	9,375	4,458	6,068
Acid, Tartaric, including Tartrates .. cwt.	2,385	1,870	9,963	7,937	COAL TAR PRODUCTS value	—	—	70,081	43,896
Bleaching Materials ..	6,882	6,573	7,869	13,745	Copper, Sulphate of, etc.	—	—	—	—
Borax ..	8,741	8,440	4,866	4,689	Disinfectants, Insecticides, etc. .. cwt.	3,585	760	50,063	11,203
Calcium Carbide ..	55,034	61,063	34,341	35,664	Glycerine, Crude ..	27,265	25,554	62,188	62,662
Coal Tar Products, not elsewhere specified value	—	—	1,102	21,374	Glycerine, Distilled ..	728	6,708	715	9,032
Glycerine, Crude .. cwt.	400	2,089	645	2,819	Potassium Chromate and Bichromate .. cwt.	4,665	13,699	16,689	27,874
Glycerine, Distilled ..	1,025	529	1,949	997	Potassium Nitrate (Salt- petre) .. cwt.	686	1,377	1,807	3,283
Red Lead and Orange Lead .. cwt.	1,658	1,458	1,707	1,367	Other Potassium Com- pounds .. cwt.	2,181	1,335	3,754	1,944
Phosphorus ..	6,551	3,249	25,794	10,589	Sodium Carbonate, includ- ing Crystals, Ash and Bicarbonate .. cwt.	1,750	1,311	8,621	8,210
Kainite, etc. ..	80,952	90,132	14,396	19,294	Caustic Soda .. cwt.	228,220	293,247	63,420	81,942
Potassium Nitrate (Salt- petre) .. cwt.	3,316	6,206	3,041	5,572	Sodium Chromate and Bi- chromate .. cwt.	167,011	115,896	100,907	79,216
Other Potassium Com- pounds .. cwt.	406,745	351,778	196,489	170,492	Sodium Sulphate, includ- ing Salt Cake .. cwt.	1,369	2,741	2,537	4,607
Sodium Nitrate ..	10,085	1,622	4,550	468	Other Sodium Compounds	77,976	79,178	8,447	9,424
Other Sodium Compounds	—	—	—	—	Zinc Oxide .. tons	50,757	160,085	59,079	113,707
Tartar, Cream of ..	18,646	37,293	14,861	28,156	Other Chemical Manufac- tures, etc. .. value	708	1,076	13,303	21,313
Zinc Oxide .. tons	670	525	2,393	1,587	Quinine and Quinine Salts	—	—	243,591	237,885
Other Chemical Manufac- tures .. value	30	59	697	1,047	Quinine and Quinine Salts	—	—	—	—
Quinine and Quinine Salts	—	—	165,849	107,231	Other Drugs .. value	137,515	76,895	17,501	8,188
Bark Cinchona (Bark Pe- ruvian, etc.) .. cwt.	85,100	55,800	8,200	4,361	Dyes and Dye-stuffs (Coal Tar) .. cwt.	—	—	197,351	202,612
Other Drugs .. value	1,092	797	6,610	4,529	Other Dyestuffs ..	7,276	8,487	65,341	84,058
Intermediate Coal Tar Products used in the manufacture of Dyes	—	—	62,924	97,223	Other Dyestuffs ..	12,333	17,006	9,794	16,973
Alizarine and Alizarine	—	—	—	—	Barytes, Ground ..	8,127	900	1,503	475
Red .. cwt.	—	—	—	—	White Lead (Dry) ..	1,738	1,903	2,861	3,259
Indigo, Synthetic ..	—	—	—	—	Paints and colours in paste form .. cwt.	15,137	19,307	26,467	32,579
Other Finished Dyestuffs	—	—	—	—	Paints and Enamels pre- pared .. cwt.	25,049	30,080	74,374	88,537
Cutch ..	3,305	3,499	86,472	79,131	Other painters' colours and materials .. cwt.	38,554	47,976	63,974	71,367
Other Extracts for Dyeing	1,044	1,667	1,222	1,654	TOTAL .. value	—	—	1,433,328	1,416,191
Indigo, Natural ..	1,299	4,522	3,643	15,838					
Extracts for Tanning (Solid or Liquid) .. cwt.	—	—	3	—					
Barytes, Ground ..	44,489	80,977	32,641	57,681					
White Lead (Dry) ..	14,133	20,525	2,503	5,024					
Other painters' colours and materials .. cwt.	4,417	5,851	5,609	7,123					
TOTAL .. value	87,977	93,075	107,237	108,055					
	—	—	824,779	891,666					
Exports									
Acid, Sulphuric .. cwt.	2,044	3,865	1,696	2,845	Acid, Tartaric, including Tartrates .. cwt.	26	13	169	95
Acid, Tartaric, including Tartrates .. cwt.	781	648	3,524	3,105	Borax ..	—	3	—	2
Ammonium Chloride (Mu- riate) .. tons	283	341	4,664	6,061	Coal Tar Products, not elsewhere specified value	—	—	17	14,198
Ammonium Sulphate ..	52,382	26,613	234,228	100,992	Potassium Nitrate (Salt- petre) .. cwt.	72	19	109	45
Bleaching Powder (Chlor- ide of Lime) .. cwt.	60,447	67,837	18,788	19,176	Sodium Nitrate ..	6,400	406	3,200	169
COAL TAR PRODUCTS—	—	—	—	—	Tartar, Cream of ..	128	102	549	402
Anthracene .. cwt.	—	—	—	—	Other Chemical Manufac- tures .. value	—	—	9,814	14,300
Benzol and Toluol gal.	197,728	35,102	18,300	5,071	Quinine and Quinine Salts	—	—	—	—
Carbolic Acid (crude) gal.	21,111	3,263	2,019	532	Quinine and Quinine Salts	6,224	8,889	840	1,113
Carbolic Acid (crystals)	—	—	—	—	Bark Cinchona (Bark Pe- ruvian, etc.) .. cwt.	63	128	173	338
Cresylic Acid .. gal.	57,671	56,012	5,878	5,183	Other Drugs .. value	—	—	15,234	10,217
Naphtha ..	3,533	4,717	171	292	Cutch .. cwt.	152	125	247	174
Naphthalene (excluding Naphthalene Oil) cwt.	9,513	5,242	1,861	1,692	Other Extracts for Dyeing	171	79	827	346
	—	—	—	—	Indigo, Natural ..	17	—	490	8
	—	—	—	—	Extracts for Tanning (Solid or Liquid) .. cwt.	1,164	238	938	177
	—	—	—	—	Painters' colours and ma- terials .. cwt.	308	418	731	739
	—	—	—	—	TOTAL .. value	—	—	34,029	48,419

Commercial Applications of Activated Alumina

Drying Liquids by Direct Contact

SOME outstanding developments in the use of activated alumina are reported in the news edition of "Industrial and Engineering Chemistry," for July 10. This material, it will be recalled, is the commercial name given to a specially dehydrated aluminum trihydrate. It is available in granular form in sizes ranging from powder to pieces approximately 2 in. in diameter. Its chief characteristic consists of its efficiency in adsorbing moisture from gases, vapors, liquids, and solids. Its inertness and permanency are features which contribute to repeated reactivations without deterioration.

Air Conditioning

Commercial use reveals that activated alumina will adsorb moisture from air and gases at practically 100 per cent. efficiency, corresponding to dew points below -60°C . During the period of complete removal of moisture, activated alumina will continue to adsorb at 100 per cent. efficiency until it has increased in weight to from 12 to 14 per cent. After complete removal of moisture, it will adsorb at lower efficiencies until a weight increase of between 20 and 25 per cent. has been attained. When the alumina becomes saturated with moisture it can be reactivated by applying heat at temperatures ranging between 175° and 315°C . After the moisture has been removed and the material is cooled again to atmospheric temperature, it is ready for further service on adsorption. This cycle of adsorption, reactivation, and cooling can be repeated indefinitely without any apparent deterioration or physical change in the properties of the adsorbent. The moisture-saturated, activated alumina may be reactivated by the application of heat. This may be accomplished in any of several ways, including the direct application of the gases of combustion, the use of imbedded electrical resistor elements, and steam or hot-oil coils.

In the atmospheric conditioning of industrial buildings, activated alumina finds one of its most attractive markets. The air in factories and process rooms often requires a definite moisture content for ideal manufacturing conditions. The air in factories and process rooms often requires a definite moisture content for ideal manufacturing conditions.

The means of supplying air with just the right moisture content, without the use of expensive refrigeration machinery, is a strong argument in favour of a dry adsorbent. Another direct application, along these same lines, is in the dehumidification and conditioning of atmospheres in storerooms and warehouses; for example, in the storage of plate glass where condensed moisture may cause an etching action, and in the storage of sheet steel which is subject to corrosion and surface deterioration in moist atmospheres.

Drying Compressed Gases

Activated alumina is particularly desirable for the drying of compressed gases. Through its use, oxygen, hydrogen, carbon dioxide, carbon monoxide, sulphur dioxide, chlorine, nitrous oxide, nitrogen, methane, butane, and helium may be completely dried, simultaneously with the removal of oil vapor, after the final stages of compression. For example, where hydrogen or hydrogen-nitrogen mixtures are used as atmospheres in annealing furnaces for treating metal sheets and metallic parts, it is necessary that the annealing gases be free from moisture to prevent corrosion or scaling. Activated alumina provides an inexpensive and efficient method of eliminating this moisture. For drying refrigerant vapours and liquids, such as ammonia, sulphur dioxide, also, methyl chloride, and carbon dioxide, activated alumina is also an effective desiccant and is extensively employed by manufacturers of equipment used in the handling of processing of all types of commercial gases and vapours.

An especially interesting property of activated alumina is its capacity for drying liquids by direct contact. It is employed commercially to dehydrate benzol in the liquid phase, and has similar application to the dehydrating of such liquids as toluol, xylol, carbon tetrachloride, carbon bisulphide, methyl chloride, ethyl acetate, butyl acetate, etc. Solids in powdered form that are difficult to dry because of the deleterious effect of elevated temperatures may be desiccated by direct admixture with activated alumina in granular form. After the drying is complete, the granular material may be mechanically separated from the finer powder.

Chemical Trade in the Netherlands

Loss of Export Markets

THE latest report issued by the Department of Overseas Trade pertaining to the Netherlands (Economic Conditions in the Netherlands: H.M. Stationery Office, 3s.) states that the policy during the past year has been rather to produce as much as possible at a low price than to seek the best markets. In addition, since 1929 trade barriers erected by other countries, and the high cost of production have combined to affect the Dutch export trade to an alarming degree. It is suggested that the country has not yet overcome its difficulties, nor even reached the lowest ebb of depression. The establishment of a Ministry of Economic Affairs, which now embraces trade, industry, agriculture and labour, has co-ordinated these interests under one head and will, it is hoped, in due course benefit the whole country.

Chemical manufacturers have been chiefly affected by the loss of export markets. As regards fertilisers and nitrates, the former have been in less demand owing to the decreased purchasing power of the farmers. The price of the latter has slightly improved owing to the working of the European Cartel. The reduced demand for the produce of oil mills is partially due to the transfer of the margarine industry to countries which have introduced a protective tariff. At the same time the demand for cake is also smaller on account of the crisis in agriculture. In the synthetic nitrate works, 30,850 tons of nitrate were produced as against 9,398 tons in 1930, the production of sulphate of ammonia amounted to 132,115 tons. The total imports of calcined soda have dropped by a few thousand tons. British imports have risen slightly but a noticeable new competitor in this line is Soviet

Russia which is importing at a price of about 46 florins (£4 at par) per ton. British imports of dyes remained negligible though slightly greater than in the previous year. On the other hand, total imports have been reduced by 25 per cent. chiefly owing to reduced activity in the textile trades. The number of soap works dropped to 57 (59). Production of soft soap amounted to 47,700 (44,700) tons; of hard soap to 2,400 (2,100) tons toilet and 14,000 (16,200) tons household; of soap powder to 12,800 (12,700) tons with a minimum of 30 per cent. fatty acids and to 7,500 tons (7,000) washing powder.

The Dutch East Indies

A similar report concurrent with the above (4s. 6d. net) has been issued from the same source and deals exhaustively with conditions in the Netherland East Indies. Here, so far as the chemical industry is concerned, the field of production in these lands is naturally confined to raw materials, which are likely to increase in importance when normal trading conditions obtain.

Petroleum returns for 1932 will not be available for some months. It is expected that the production of crude oil will show a considerable reduction on the 1931 figure, as much has been heard regarding retrenchment undertaken by oil companies and restriction of output during the past twelve months. This supposition is, however, not confirmed by the only return available for 1932, namely, the output of the Tarakan oil fields, which is returned at 831,910 tons as against 728,570 tons in 1931. The crude oil obtained from the Tarakan fields is of such high quality that by a simple pro-

cess the water and sand can be removed, rendering the oil suitable for bunkering purposes without further treatment.

As regards refining, the latest oil refinery to be completed in Netherland India, which is owned and operated by Ned. Ind. Koloniale Petroleum, and situated near Palembang, Sumatra, was officially opened late in 1926. It receives its supply of crude oil by pipe lines which originate in the Talang Akar and Pendopo fields, 82 miles distant. The installation is of the latest design, including cracking equipment. The initial capacity was 4,000 barrels a day, which has been increased to 25,000 barrels. The principal products are gasoline and kerosene; however, the refinery produces a complete range of products except lubricating oil and asphalt, and during the latter part of 1930 a wax plant was put in operation.

Valuable Superphosphate Deposits

It is announced that valuable deposits of superphosphates have been located in Central Java. A preliminary survey shows that the seam averages two metres in both width and depth and may contain 250,000 tons of phosphates. The discovery will be further explored by the Department of Mines. It is also reported that phosphate deposits located in North Bantam (Java) will be further examined. Samples have been taken, which, on analysis, show a phosphorous pentoxide content of from 26 per cent. to 37 per cent.

The Nederlandsch Indische Bauxite Exploitatie Maatschappij was registered on December 6, 1932, for the purpose of exploiting bauxite deposits located in the island of Bintan, Riouw Archipelago. The promoters are the Nederlandsch-Indische Tin Exploitatie Mij., N.V. Billiton Mij., N.V. Oost Borneo Mij. and the N.V. Mijnbouw Mij. Acqua-tor, constituting a strong combination.

The export of cinchona bark by Java increased from 4,929 tons in 1931 to 5,292 tons in 1932; 4,095 tons were shipped to Holland, 605 tons to the United Kingdom and 394 tons to Italy. Exports of quinine salts decreased from 54,483 kilos in 1931 to 41,648 kilos in 1932.

The imports into the Netherland East Indies of manufactured materials have suffered a further set-back compared with 1931. The value of imports under the chemical group has decreased from 53,793,000 florins (about £4,500,000 at par) in 1931 to 34,541,000 florins (about £2,900,000 at par) in 1932, a drop of 35.79 per cent. Imports of soap, of which Great Britain supplies more than half, also declined. The import and use of distilled spirits with a wood alcohol content, for the preparation or sale of scents and perfumery is prohibited. The customs authorities hold that wood spirit consists principally of methyl alcohol. A summary in English of all legislative enactments in this connection may be examined at the Department of Overseas Trade.

Luton's Chemical Industry

How Straw Hat Making Fostered Two Thriving Concerns

FOR the further recognition of the town of Luton as something more than "where the straw hats come from," an industrial development committee has issued a brochure entitled "Progressive Luton." It is, of course, true that the chemical industry there was started with a view to supplying the hat makers with bleaching agents, but the time has long since passed when the two most important firms were content merely to cater for local requirements. A brief outline of the history and activities of these two firms may give an idea of the extent to which little things have grown to be big things.

Alcock (Peroxide), Ltd.

Although the war period was a difficult time for the firm of Alcock (Peroxide), Ltd., it indirectly initiated the process of continually widening the scope of this firm. During the war, difficulty in obtaining barium peroxide was experienced because the overseas source of supply had been cut off, but as the need for hydrogen peroxide among straw hat makers in no way abated, a plant for making the raw material was erected. After the war imports at low prices and foreign tariff barriers caused considerable dismay, but by the adjustment of their policy the difficulties were surmounted.

In 1930, Alcock's, in the course of investigations of new peroxide processes, turned their attention to the industrial application of soluble silicates as offering a field of activity which did not appear to have been fully explored. Reference to literature reveals that W. N. Bacon in 1905 produced a crystalline *meta*-silicate, but the technique of detergency at that time was so far behind the position it occupies to-day that the commercial possibilities of metasilicate in that direction were not fully realised.

A new line of procedure for investigating possibilities of metasilicate of soda was decided upon by the firm, and experiments were well in hand when the Philadelphia Quartz Co. of America announced, on its one-hundredth anniversary, that they had succeeded in producing sodium metasilicate in a crystalline form suitable for commercial purposes. Encouraged by these developments, Alcock's erected a small plant on the results of their research, and their activities in this connection soon became sufficiently well known to justify increased production.

In the laundry, metasilicate of soda is invaluable as a soap builder and as a cleanser the yellowing action of ordinary alkalis on white fabrics does not occur, and, as a result of experiments on cotton cloth, it has been shown that metasilicate falls into the class of the milder alkalis. This agent

has also proved itself to be an efficient cleanser in the dairy industry. It removes casein and albumen from milk bottles, leaves them clear and bright, and, having strong bactericidal properties, also leaves them sterile. The advantages enumerated above are useful in the case of bottling plants, or any kind of plant which packs food and beverages in glass. Metasilicate of soda is already finding application in motor car factories for removing oil and grease from metal parts without fear of corrosion, and for cleaning metal surfaces prior to electro-plating.

B. Laporte, Ltd.

In 1888, Mr. Bernard Laporte founded the firm of B. Laporte, Ltd., at Shipley, near Bradford, and later opened a branch in Luton for the purpose of developing the hydrogen peroxide method of bleaching strawplait. This branch expanded quickly, and Mr. Laporte made Luton his headquarters, converting the business into a limited liability company in 1907.

In 1915 a large site was acquired in Kingsway, Luton, and here new works buildings were planned, erected and equipped on scientific lines. Further extensions to the works are contemplated in the near future. Hydrogen peroxide still represents a major activity, and besides bulk supplies in all strengths, a product for medical and personal use is also marketed. A process for the manufacture of hydrogen peroxide by electrolysis has recently been evolved, and a large-scale plant is now making a product of high concentration. Laporte's claim the distinction of being the only manufacturers by this process in the British Empire.

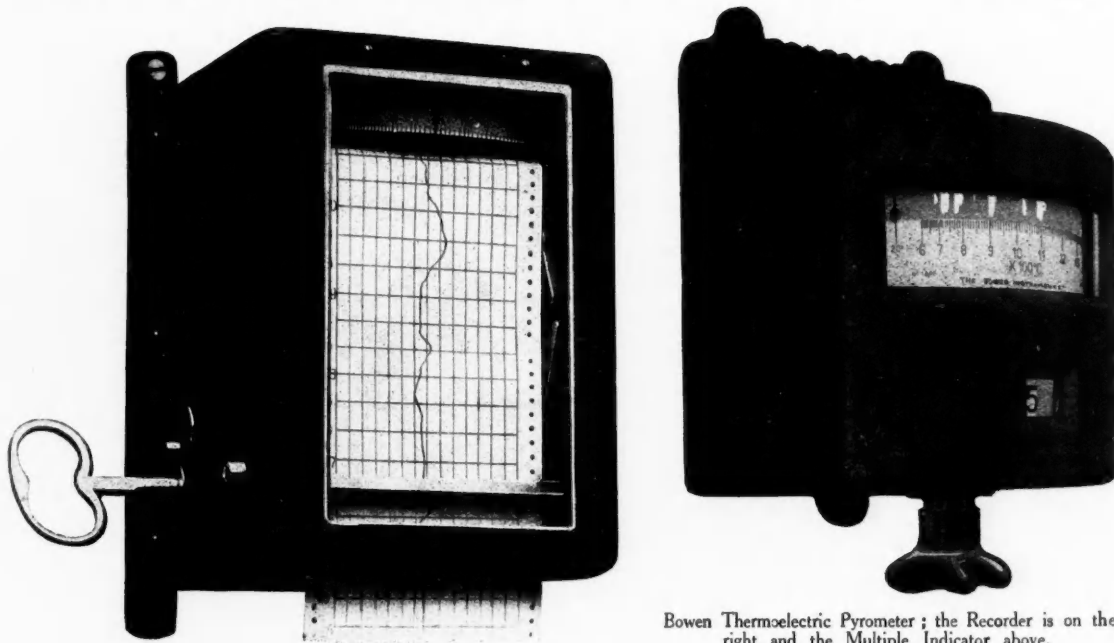
Laporte's sodium sulphide is supplied to the tanning, dyeing, and artificial silk industries for their processes, and small quantities are also employed by dyers in the application of sulphur black dyes. The manufacture of detergents for laundries is one of the more important aspects of Laporte activities. Since its inception, the company has specialised in the preparation of a range of products to meet all the needs of the laundry industry. Laporte's latest enterprise is also Luton's newest industry. National Titanium Pigments, Ltd., a subsidiary, began in May last to manufacture the group of pigments containing titanium dioxide. Other subsidiaries and associates, five in number, go to make up the group which caters for the home demand that has been created and also for an export trade delivery to many important countries.

Works Equipment News

A New Thermocouple

IN any thermoelectric pyrometer, the reliability of its temperature readings depend upon the constancy of the thermocouple employed; and the ideal thermocouple is that whose characteristics are preserved indefinitely under all heating conditions. Several types of base-metal thermocouples are now in regular use up to certain temperature limits; and the wide experience of pyrometer makers is an invaluable guide for the correct choice and application of these materials. With such guidance it is fair to assume an average life of from 6 to 12 weeks with existing types. A great advance

Moreover, sheaths may in many cases be dispensed with, further to reduce costs, and also to eliminate time lag as well. Whilst not at present covered with a guarantee of life, these thermocouples may be used up to $1,300^{\circ}\text{C}$ and over with an economic life—and indeed it is beyond $1,000^{\circ}\text{C}$. that the advantages of the new thermocouples shew up greatest—as instanced by the lead bath insertion mentioned above. The excellent properties of the Pyrofer wires are further utilised in their application to resistance pyrometers. Hitherto, resistance pyrometer coils have been constructed of platinum



Bowen Thermoelectric Pyrometer; the Recorder is on the right and the Multiple Indicator above.

has therefore been achieved by the use of a new thermocouple, the "Pyrofer," which is composed of two wires, one of which possesses extraordinary heat-resisting properties which are even more outstanding than nichrome, which forms the second element and whose satisfactory performance at high temperatures is well known. The sole manufacture of the new thermocouple has been taken up under licence by the Bowen Instrument Co.

The breakdown of existing thermocouples is almost always due to affection of the negative element by rapid oxidation, or other destructive cause; and investigations have hitherto failed to discover a suitable negative element until the advent of the Pyrofer materials. Something of the merits of the new thermocouple may be realised by the fact that when immersed without protection in a lead bath at $1,350^{\circ}$ or $1,400^{\circ}\text{C}$. the materials shewed not the slightest sign of deterioration after some hours of heating, whereas the best of other types broke down in less than one minute. The Pyrofer thermocouple resists affection by CO , SO_2 and other such destructive gases presented in small quantities in furnace and flue gases and the like; and in fact, since the same materials are being successfully used for furnace structures, resistance heaters and other high temperature uses, its equal value in relation to pyrometry may be realised.

When used in muffle or oven furnaces up to $1,000^{\circ}\text{C}$. with any method of heating, Pyrofer thermocouples are supplied with a guaranteed life of 12 months under fair wear and tear. Thus the resulting economy is considerable; for example, an installation of 20 thermocouples may now cost over £100 per annum, with spares valued at about £20 in stock; but with the new thermocouples, the annual upkeep would cost less than £30, and the stock of spares negligible.

or nickel, and have been restricted to below 550°C . owing to instability of constants. Using the Pyrofer coils however, resistance pyrometers may now be used up to $1,000^{\circ}\text{C}$.—and with 200° across the scale (say from 600° to 800°C .), the more open scale and greater accuracy secured are often of immense advantage, especially where automatic control of temperatures is applied.

Wood for Steam Generation

AN enormous amount of wood, particularly such material as sawdust and shavings, is being used throughout the world as fuel for steam generation, but as a rule poor results as regards thermal efficiency are being obtained. Sawdust, for example, is not an easy fuel to burn.

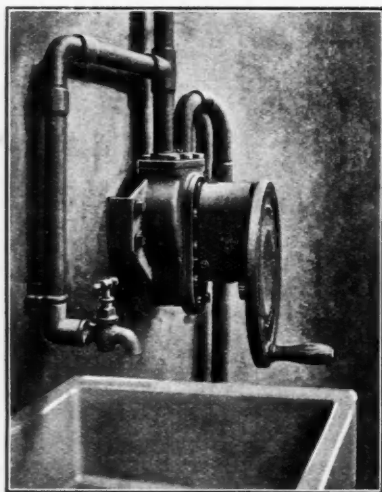
In general newly-felled wood, taking an average through most common woods such as oak, beech, poplar, elm, chestnut, hickory, birch, and willow, has 30-50 per cent. moisture. After 8 to 12 months' air drying or "seasoning" the moisture content is reduced to 20-25 per cent., the heating value being 5,000-6,000 B.Th.U. per lb. Perfectly dry wood averages 49-50 per cent. carbon, 5.9-6.2 per cent. hydrogen, 39-42 per cent. oxygen, 0.9-1.3 per cent. nitrogen, and 0.7-3.2 per cent. ash, and about 2-2½ lbs. of seasoned wood is equal to 1 lb. of average coal. The pines and certain other woods contain resin, which increase the heating value.

Obviously one of the main difficulties of the use of wood as a fuel for steam generation is the moisture content, and some form of forced, as distinct from natural draught, is essential to obtain an adequate rate of combustion. In this connection the "Turbine" hand-fired forced draught furnace is of great value, being equally suitable also for any type of boiler, cylindrical, vertical, locomotive or water-tube. All kinds of

wood and general vegetable refuse material are being burnt on these lines with excellent results, as well as peat, lignite, and semi-bituminous coal. Essentially the design is that of a grate made up of large longitudinal hollow cast iron troughs, side by side, say five in number, for a standard 3 ft. wide grate in the case of a "Lancashire" or other cylindrical boiler, each with a forced draught steam nozzle, while the surface of the grate is composed of a large number of small and short transverse interlocking slotted firebars fixed across the top of the troughs. These elements have a lower sloping projecting portion like the blade of a turbine which dips in the blast current of air and steam in the troughs below, diverting the correct small volume of air corresponding to the particular aperture. A mechanical draught fan can be used equally well in place of steam jets, which latter do not take more than 2½-3 per cent. of the evaporation of the boiler—no more than mechanical draught—and circular grates of this type are supplied for vertical boilers. The general action is to give an intense local heat, and because of this sawdust or other wood refuse can be burnt without pre-drying the material.

A Small Hand-Operated Pump

A SMALL but satisfactory hand-operated rotary pump has now been introduced after a considerable amount of experimental work. This patent "Othena" pump is self-priming and will draw water from a depth of 20 feet or more; it does not require a valve at the end of the suction pipe. It will force water against a head of 50 feet or more without difficulty. It has no valves and, therefore, practically nothing to go wrong. In addition the complete rotary action materially assists in ease of operation, and the pump can be arranged so as to be rotated in either direction. Supplied complete with branch plate tapped 1 in. gas for suction and delivery pipes, gear wheel guard, and coach screws for fixing, the net weight is only 57 lb. It is only necessary to fix this pump securely



The "Othena" Hand-Operated Pump.

on to a wall or upright and to connect up the suction and delivery piping to the screwed holes in the top branch plate. After the pipe-work is fixed the pump must be filled with water by removing one of the plugs in the top branch plate. Having been once primed in this way no further priming should be necessary unless the pump is allowed to stand for a long time. An emptying plug is provided at a low point on the body, which can be used if the pump is exposed to frost at any time. When turned at the rate of 80 revolutions per minute the pump should deliver about 200 gallons per hour, providing there is no leakage on the suction side. The makers are Rhodes, Brydon & Youatt, Ltd.

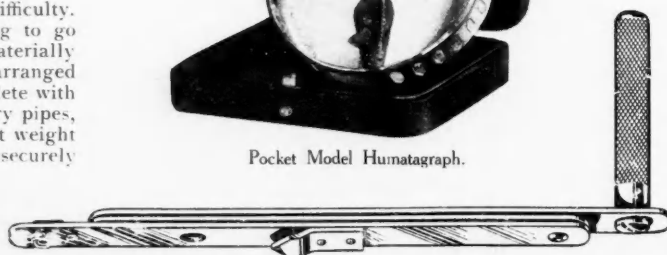
A "Pocket Model" Humatagraph

THE humatagraph illustrated introduces a new feature in registering hygrometers. It can be whirled and give very quick results; in normal circumstances the instrument shows the correct humidity, but sometimes it is desired to take it

to some place where the differential of humidity is considerable, *i.e.*, from a very damp place to a dry one or *vice versa*. A folding arm or whirler is therefore provided which enables the operator to secure the rapid movement of air over the sensitive absorbent fibre in the instrument and thus determine the humidity of the air in a few minutes. Two minutes rapid whirling will give a very accurate reading. The humidity in large factories often differs in different rooms and often in different parts of the same room, but this low-priced instrument will make it possible to secure more reliable information as to working conditions. The casing of the instrument is strongly made so that it can be placed between reams of paper, or bales of soft material, to determine the humidity of the mass. Unlike an hair hygrometer it will require very little adjusting. This instrument is supplied by A. Gallenkamp and Co., Ltd.



Pocket Model Humatagraph.



Whirler for Use with the Humatagraph.

A New Preservative Paint

FOR over 19 years Guthrie and Co. have been investigating the properties of preservative paints and coverings. During the last three or four years the team work of the chemists and engineers associated with this enterprise has resulted in two important developments. In the first place the chemistry of new methods of developing coverings in the form of paints, or plastics, has been perfected. Secondly, the applicability on the large scale has been properly consolidated. Their latest preservative paint is heat-proof, shrinkage-proof, highly adhesive, exceedingly tough, is used with water, and can be supplied in white, stone, and most other colours. To show its chemical resisting nature, a piece of steel was coated with this material and placed in an acid autoclave at 80 lb. steam pressure, immersed in salt solution for some hours. Under these conditions the coating was quite unaffected. Another instance has been shown in the case of a works where it was desired to have a paint for the inside of hot sulphate of ammonia evaporators. At first sight this looked an impossible proposition, but the Guthrie (3P) coating has now been in satisfactory use for several months.

Rubber and Vulcanite

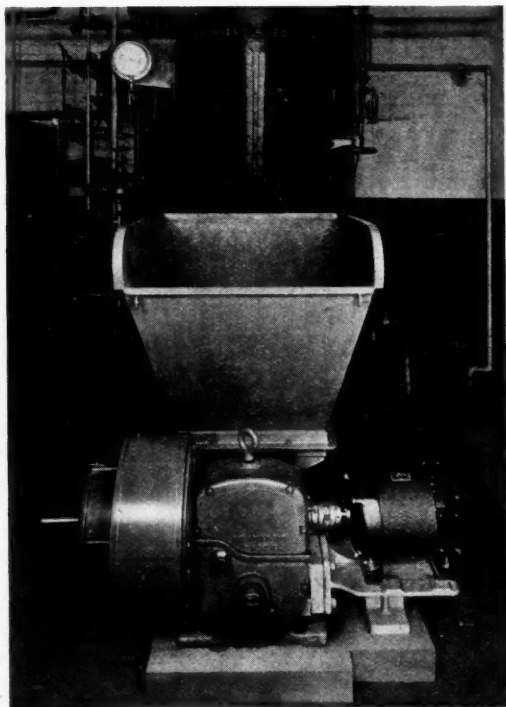
SOLID rubber tubing for acid work is manufactured by David Moseley and Sons, Ltd., and their standard quality "1935 A Grey" has become known in the chemical industry as one of the most reliable tubing that it is possible to obtain. It is something more than the ordinary grey tubing, and invariably proves cheapest in the end.

The firm also specialises in ebonite or vulcanite goods for the chemical and other industries. Illustrations of actual plant made by Moseley and Sons, Ltd., of some of the many types of articles that are constantly being produced, can be seen in a brochure issued by the firm. These articles include pipes and tubes of all sizes and strengths

(made with or without flanges), bends, elbows, teepieces, taps, pumps, air vessels, acid pourers, funnels, ejectors and sparge boxes for vinegar vats. There are many other articles that can be made or covered with vulcanite. The firm's long experience of the chemical trade has convinced it that to obtain satisfaction only the best quality of ebonite should be used. The rubber has a reputation in the trade which is built upon a record of over 40 years, during which many industries have been supplied with articles made of this identical grade.

Mechanical Stoking

ONE of the reasons why oil-firing has been extensively adopted for heating boilers, both as regards hot water and steam, is that of convenience; the firing, when once adjusted, requires very little attention, while completely automatic equipment is also available. Apart from this, however, the use of imported oil instead of British coal is a very bad business proposition, since oil costs about three times as much



The "Mastoker," operating a Cochran Vertical Boiler.

per available heat unit. Coal at 20s. per ton and 12,000 B.Th.U. per lb. is equivalent to 0.89d. per 100,000 B.Th.U., whereas oil at £3 10s. (including the new duty) and 17,500 B.Th.U. per lb. is 2.1 pence per 100,000 B.Th.U. For this reason the "Mastoker," manufactured by Prior Burners, Ltd., is an interesting piece of equipment. It is a small electrically driven automatic stoker, for operating heating as well as small steam boilers with coal, preferably bituminous slack. No more attention is required than in the case of oil burners, for operation is completely automatic, and as compared with oil the fuel bill can be cut in half. The unit occupies very little room; it is fixed in front of the boiler and consists essentially of a hopper, a variable speed reduction-gear driven by an electric motor, a multiple-bladed forced draught fan, a trunk connection for the air, automatic control gear, a horizontal rotary screw feed for the coal and a grate. Operation is on the efficient "underfeed" coking principle and a range of standard sizes is available, burning from 10-400 lb. of coal per hour, with electric motors of $\frac{1}{4}$ -2 h.p. and hoppers holding 275-550 lb. of coal.

The basic principle of "underfeed" stoking is the use of a deep retort or burner without bars, the coal being supplied from underneath and travelling upwards. Inside this retort carbonisation takes place, and all the gases and vapours

evolved are burnt by the incandescent fire above, thus giving smokeless combustion and maximum emission of radiant heat. Forced draught has to be used, passed into the coal bed, also beneath the incandescent surface through holes or tuyers, giving a "blow-pipe" effect, but requiring little power because of the short distance of travel and absence of air leakage. By merely altering the speed by means of the gearbox the amount of coal fed by the screw is altered as required, while the air supply is also adjustable so as to suit the various grades of coal. The stoker is designed to operate under completely automatic control, by a thermostatic device fixed in the hot water pipe circuit, using electrical gear which controls the working of the motor.

Industrial Safety Appliances

THE well-known submarine and safety engineers, Siebe, Gorman and Co., Ltd., are again exhibiting their very wide range of respiratory appliances at the Shipping, Engineering and Machinery Exhibition, which is in progress at Olympia. At their stand they are showing a model of a fully dressed diver equipped for deep sea work, harbour, dock or bridge building, including telephonic apparatus, submarine electric lamps, etc., and a power-driven air compressor for diving purposes. In the fire fighting section there is the well-known "Proto" and "Salvus" types of self-contained oxygen breathing apparatus, as extensively adopted by fire brigades in all parts of the world, smoke helmets of various patterns, and fire extinguishers and appliances. The gas section exhibit comprises gas masks for protection against ammonia fumes in cold storage plants; "Antipox" short



The Stand of Siebe, Gorman & Co. Ltd., at the Shipping, Engineering and Machinery Exhibition, Olympia.

distance breathing apparatus; and "Novox" oxygen and carbon dioxide and "Novita" (oxygen) resuscitation apparatus for apparently-drowned or asphyxiated persons. Included are also various forms of dust and spray masks, protective goggles, gloves and clothing, first-aid outfits, etc.

A striking feature of this exhibit is the display of the various apparatus under actual working conditions. In a life-like series of tableaux are shown divers at work under water, mine rescue workers equipped with "Proto" self-contained oxygen breathing apparatus rescuing unconscious people from a burning building, and ambulance men treating the rescued man with the "Novox" resuscitation apparatus.

In addition, there is a scene depicting the recent flight over Mount Everest, and showing the oxygen apparatus and electrically-heated clothing which the firm supplied to this expedition.

Mason and Barry, Ltd., London, manufacturers of pyrites from Portuguese deposits, recently reported that they became interested some years ago in a new process for the separation of sulphur from pyrites. The company invested some thousands of pounds on a trial plant, which was unsuccessful. It is now reported that the process has been perfected and is employed elsewhere on an extensive commercial scale. The company has an interest in the process and is considering the advisability of installing equipment at S. Domingos for the purpose of treating a portion of their output.

Chemical Industry Lawn Tennis Tournament

To-day's Finals at Dulwich

By the kind invitation of Johnson, Matthey and Co., Ltd., 73/82 Hatton Garden, London, the finals of the third annual Chemical Industry Lawn Tennis Tournament, arranged by THE CHEMICAL AGE, will be played at that company's courts at The Toll Gate, College Road, Dulwich, to-day (Saturday), commencing at 3 o'clock prompt. THE CHEMICAL AGE silver challenge cups will be presented to the winners. In addition there are six solid silver cups to be won outright. Three "Invicta" cups, presented by Thomas Hill-Jones, Ltd., will be awarded to the two winners of the doubles and the winner of the singles respectively, while three "Lloyd-Willey" cups of similar pattern, presented by Mr. W. Lloyd-Willey, will be given to the two runners-up in the doubles and the runner-up in the singles.

The remaining semi-final in the men's doubles was played on September 9, when R. C. Pennington and R. George (J. Crosfield and Sons, Ltd., Warrington), beat L. Giltrow and G. F. Hammond (Williams, Hounslow, Ltd.) by 6-2, 2-6, 6-3. Pennington will therefore be playing in both the singles and doubles finals, the finalists being as follows:

SINGLES.	
Copp, C. G. Doulton & Co., Ltd., 28, High Street, Lambeth, London, S.E.1. (Reliance 1241.)	Pennington, R. C. J. Crosfield & Sons, Ltd., Bank Quay, Warrington. (Warrington 800.)
Haines, J., & Hawley, F. G. Anglo-Persian Oil Co., Britannic House, Finsbury Circus, London, E.C.2. (National 1212.)	Pennington, R. C., & George, R. J. Crosfield & Sons, Ltd., Bank Quay, Warrington. (Warrington 800.)

DOUBLES.

The following records show how the finalists have fared in the earlier rounds of the tournament:

SINGLES.
COPP, C. G.—Preliminary round, beat R. F. Porter (Howards and Sons, Ltd.), 6-2, 6-4; 1st round, beat H. Barningham (Monsanto Chemical Works, Ltd.), 7-5, 4-6, 6-3; 2nd round, beat W. J. Sharman (Williams (Hounslow), Ltd.), 6-2, 6-0; 3rd round, beat L. Giltrow (Williams (Hounslow), Ltd.), 6-3, 4-6, 6-3; semi-final, beat L. Grape (Borax Consolidated, Ltd.), 2-6, 6-2, 6-4.
PENNINGTON, R. C.—1st round, beat W. Speakman (Monsanto Chemical Works), 4-6, 6-4, 6-2; 2nd round, beat P. A. Tunstall Salt Union, Ltd.), 6-0, 6-0; 3rd round, beat A. Collins (British Oxygen Co., Ltd.), 6-0, 6-0; semi-final, beat R. George (J. Crosfield and Sons, Ltd.), 3-6, 6-0, 6-0.

DOUBLES.

HAINES, J., and HAWLEY, F. G.—1st round, beat M. H. How and J. Shaw (Johnson, Matthey and Co.), 6-3, 6-4; 2nd round, beat

R. Welsh and E. Thomsett (British Oxygen Co.), 6-0, 6-0; 3rd round, beat V. J. Prosser and A. Baxter (John Haig and Co., Ltd., and United Yeast Co., Ltd.), 7-5, 7-5; semi-final, beat W. L. Aldis and S. B. Perridge (Brandhurst Co., Ltd.), 6-3, 6-0.
PENNINGTON, R. C., and GEORGE, R.—1st round, beat S. E. Chaloner and W. Speakman (Monsanto Chemical Works, Ruabon), 8-6, 6-1; 2nd round, beat W. B. Miller and G. Lord (British Celanese, Ltd., Derby), 6-3, 6-0; 3rd round, beat L. F. Grape and A. F. Childs (Borax Consolidated, Ltd.), 6-3, 6-2; semi-final, beat L. Giltrow and G. F. Hammond (Williams (Hounslow), Ltd.), 6-2, 2-6, 6-3.

The records of matches, sets and games played by the finalists to date are as follows:

DOUBLES.		Played.	Won.	Lost.
Pennington, R. C., and George, R.	Matches	4	4	0
	Sets	9	8	1
	Games	78	52	26
Haines, J., and Hawley, F. G.	Matches	4	4	0
	Sets	8	8	0
	Games	70	50	20
SINGLES.				
Copp, C. G. ...	Matches	5	5	0
	Sets	12	10	3
	Games	117	71	46
Pennington, R. C. ...	Matches	4	4	0
	Sets	10	8	2
	Games	73	55	18

In the first round Pennington and George defeated Chaloner and Speakman, who won the cup last year, and in the semi-final they defeated Giltrow and Hammond, who were the runners-up last year. Pennington and George have not played in THE CHEMICAL AGE tournament before, but Pennington, with another partner, scratched in the first round of the 1932 Tournament. Haines and Hawley are new-comers this year and have beaten Aldis and Perridge in the semi-final. Aldis and Perridge have been in the Tournament each year; they have done well but have not yet won the cup. Copp is the only finalist who has had to play in five rounds, having been drawn in the preliminary round against R. F. Porter, of Howard and Sons, Ltd. Last year he was in the semi-final of the doubles, and this year in the singles he beat Giltrow in the third round after being 6-3, 4-6 at the second set. Giltrow was one of the runners-up last year.

Mr. J. Shaw, of Johnson, Matthey and Co., has kindly undertaken to act as umpire. The cups will be presented at the close of play by Mr. Gordon Robbins, deputy-chairman of Benn Brothers, Ltd., publishers of THE CHEMICAL AGE.

Mining Research at Birmingham

The Oxidisability of Coal

IN its report on the work of the Mining Research Laboratory, Birmingham University, during the year 1932, the executive board states that the British Colliery Owners' Research Association has continued to finance the work of the Laboratory at the same rate as in recent years, *vis.*, £2,750 per annum. This has covered the main cost of the administration of the laboratory, and the expense of investigations connected with the occurrence of silicosis in coal mines, underground illumination and certain aspects of the utilization of coal. Investigations of spontaneous combustion and of the production underground of dangerous atmospheric conditions have been continued under grant of £1,600 from the Miners' Welfare Fund made on the advice of the Safety in Mines Research Board. Investigations being carried out, through the laboratory for the Committee of the Institution of Mining Engineers, on the control of atmospheric conditions in hot and deep mines have been covered by another grant from the Miners' Welfare Fund of £1,400 for the year. Other investigations have included the measurement of the quantity and pressure of fire-damp in various coal seams as worked.

Investigations under the heading of "Silicosis and Dust in

Coal Mines," have, during the past year, been concerned with methods for the determination of free silica, with analyses of rocks found in "hard headings" and of stone dusting materials used at various collieries throughout the United Kingdom, and the estimation and analysis of dust actually suspended in the air during the driving of headings or in other underground roadways. There is no doubt that this subject is of very great importance to the mining industry since in the future the industry will have to meet a considerable increase in compensation claims on the score of silicosis. About fifty samples of stone dust were obtained during the year from various collieries throughout Great Britain and analysed for free silica. The collieries from which these samples have been obtained have been chosen so as to give results representative of stone dust usage in the various mining districts of the United Kingdom. Up to the present samples have been obtained from collieries producing a total of about forty million tons of coal per annum. Continuation of this work seems eminently desirable in view of the fact that several collieries would appear to be using dust containing over 35 per cent. free silica.

The use of coal gas in internal combustion engines is of great importance to the coal mining industry. The laboratory is therefore co-operating in investigations connected with the use of compressed coal gas for motor transport purposes. Valuable practical work has been carried out by Dr. C. M. Walter and his colleagues of the Industrial Research Laboratory, Birmingham, as a result of which a Birmingham Corporation bus is now running regularly on compressed gas. It is clear that the cost of compression is the largest charge on the use of coal gas in this way, and the laboratory investigations have therefore been concerned with various methods for the production of gas of high calorific value from ordinary coal gas. The cost of compression per therm of pure methane will be approximately half that of coal gas of 450 B.Th.U., and by the use of compressed gas of high calorific value the radius of action of a vehicle is increased proportionately.

The Mining Research Laboratory investigations are being made in the hope that a cheap method may be evolved for increasing the calorific value either by separation and concentration of methane from ordinary coal gas or by the production of methane by combination of carbon monoxide and hydrogen in the presence of a catalyst. It is believed that a cheap method for the production of gas of high calorific value from ordinary coal or coke oven gas will greatly increase the prospects of the utilisation of compressed gas for motor transport.

Experiments have been continued in the Mining Research Laboratory on the rate of oxidation of coal and the resultant production of oxides of carbon, particularly in relation to

the oxygen absorption, the influence of physical condition and of extraneous material upon the oxidisability of certain coals, as well as underground investigations in North Staffordshire, Lancashire, Denbighshire, Warwickshire, Leicestershire, and South Derbyshire. The underground investigations have been concerned with the detection of heatings by means of accurate gas analysis, in particular the estimation of carbon monoxide.

Experiments on the influence of physical condition and of extraneous matter upon the oxidisability of coal have been continued. The influence, upon rate of oxidation, of magnesium oxide, added to the extent of 20 per cent., has been tested in the case of a Warwickshire slate coal, the oxidation tests being carried out at 100° C. The rate of oxidation calculated to pure coal was not increased but rather decreased by the addition of magnesium oxide, the decrease being, however, only just outside the order of experimental error. The same coal has also been tested after treatment with 1½ per cent. of its weight of formaldehyde under pressure. The rate of oxidation subsequently determined at 100° C. was slightly less than that of the untreated material. The test was carried out in the first place to ascertain whether a highly oxygenated coal could be made to "condense" with formaldehyde, in a manner similar to the "Bakelite condensation" and by so doing reduce the number of molecular groupings reactive to oxygen. The results indicate that this has not taken place to any great extent although it was interesting to find a slight but definite increase in CO production (relative to oxygen absorption).

News from the Allied Industries

Solvents

DISTILLERIES for the manufacture of industrial alcohol will shortly be established in the Irish Free State under the control of the Government.

Canning

SIR WILLIAM DUDLEY, president of the Co-operative Wholesale Society, opening a new cannery at Lowestoft, on September 7, mentioned that 40 new food products would be dealt with and 500 people would be employed. This was an extension of the cannery opened four years ago, and which now has a turnover of £6,000 a week. Mr. Hawkins, of Sheffield, presided. An exhibition of Co-operative canned products was held.

Iron and Steel

THERE WERE SEVENTY-THREE FURNACES in full blast at the end of August, the four furnaces which had been damped down in Scotland at the end of July having resumed operations, and two other furnaces which were put into blast being offset by two furnaces having ceased operations during the month. The production of pig-iron in August amounted to 362,700 tons, compared with 343,900 tons in July and 259,400 tons in August, 1932. The production includes 104,300 tons of hematite, 168,700 tons of basic, 74,100 tons of foundry and 7,800 tons of forge pig-iron. The output of steel ingots and castings in August, which was affected by holidays, amounted to 551,300 tons, compared with 567,500 tons in July and 361,500 tons in August, 1932.

Distilling

A WARNING TO DISTILLERS not to be led into flooding the market with new whisky, and an appeal to them to support the farmers by buying home barley, were made at a meeting of the Scottish Pot Still Malt Distillers' Association, held at Elgin this week, when nearly every Highland distillery was represented. Mr. James Robertson, the president, said that although the position looked better, there was a continued drop in home consumption, and as the stocks in bond were still too large for what was at present the normal demand they must watch the position carefully. If there was a general rush to produce to the limit of capacity, all the benefit of the sacrifices would be lost and the market position made perhaps worse than before. If the output was kept within reasonable bounds, the quantity of barley required could largely be got from the home producer.

Artificial Silk

AT THE FIFTH ANNUAL MEETING of Kirklees, Ltd., held in London on September 12, the keynote of Mr. William Tong's address, as chairman, was one of quiet confidence. The company has had many difficulties to face, and in order to float it into the stream of prosperity, fresh finance will be necessary. In due time shareholders will be given a first opportunity to subscribe. The company's order book was stated to be in a condition to ensure full-time working in the factory for a considerable period.

Pharmaceutical

IT IS ANNOUNCED by Sangers, Ltd., the old-established firm of wholesale druggists, that an agreement has been entered into for the acquisition of the business of May, Roberts and Co., Ltd. This company is engaged in the same type of trade, and was established about 70 years ago. The purchase money is payable in 5½ per cent. preference shares, ordinary shares, and the balance in cash, and in order to carry out the transaction it is necessary to increase the capital of Sangers, Ltd., to £1,040,000 by the creation of 360,000 5½ per cent. cumulative preference shares of £1 each to rank *pari passu* with the existing 7½ per cent. cumulative preference shares and 720,000 ordinary shares of 5s. each. Arrangements have been made for an offer for sale early next month of a sufficient number of these preference and ordinary shares to enable this transaction to be carried out and provide any further working capital that is required. Shareholders on the register at the date the offer is made will be given preferential consideration.

Alkali Production in Venezuela

THE Venezuelan Ministry of Finance has entered into a contract with Compania Anonima "La Industrial Quimica Nacional" for the production of chemicals from sea salt. According to the terms of the contract the company is to establish within two years one or more plants for the production of sodium carbonate, sodium bicarbonate, sodium hydroxide, ammonium chloride, calcium chloride, and other products and by-products derived from sodium chloride. It is understood that machinery and new chemical plant has been purchased and that the factory will soon be completed and ready for operation. The contract with the Ministry of Finance ranges over a period of 30 years.

Weekly Prices of British Chemical Products

Review of Current Market Conditions

The following market report is based on information supplied by the British manufacturers concerned, and unless otherwise qualified the figures quoted apply to fair quantities, net and naked at makers' works. Where no locality is indicated, the prices are general for the United Kingdom. Particulars of the London chemical market are specially supplied to THE CHEMICAL AGE by R. W. Greeff and Co., Ltd., and Chas. Page and Co., Ltd., and those of the Scottish chemical market by Chas. Tennant and Co., Ltd.

The volume of business in the home chemical market increased slightly during the past week, although alterations in quoted prices have been rare. The greater activity has given rise to a strong feeling that by the end of the month the market generally will have assumed a brighter tone. Among industrials, supplies of formaldehyde in all quantities have been in good demand, and the competition recorded last week remains strong. Other active items were acetone, saltcake, sodium chlorate, formic acid, hydrochloric acid and ammonium chloride. Orders for the last named product have held up well. Supplies of acetate of lime are still scarce, although inquiries have been more frequent than recently, while charcoal continues to be prominent. With regard to coal tar products, the only weak spot is refined tar, which is no longer in large demand owing to the time of year. Reports in all other sections are encouraging—creosote oil maintains its better position, the demand for pitch has increased, although definite orders are scarce owing to the unfavourable price, and heavy solvent naphtha has received more attention. Stocks of motor benzol and solvent naphtha are very low. Prices have remained practically unaltered, with the exception of a higher quotation for pure toluole. The condition of the wood distillation industry remains unchanged. Uncertainty of currency exchange has been responsible for holding up the importation of pharmaceutical products, which have generally shown moderate activity. The essential oils market also gives no cause for anxiety.

LONDON.—There is a steady demand for chemicals generally, and prices remain firm. The market for coal tar products shows no change from last week, and prices remain steady.

MANCHESTER.—Business in chemical products on the Manchester market expands but slowly after the seasonal slackness, and a moderate business during the past week has been made up largely of small parcels, though sellers state that in most instances buyers are taking fairly satisfactory quantities of the heavy materials against orders on the books. Sulphide and nitrate of soda this week have been in quiet demand, with a moderate movement reported in the case of most of the other soda compounds. Fresh business of any consequence, however, has been as scarce in these as in most other materials. A quiet trade has been put through in caustic potash and carbonate, but in other respects the demand has been slow. Generally speaking, there has been no shortage of supplies in any section though values maintain a firm front in most cases. The easier tendency of the non-ferrous metals is making its influence felt to some extent on the copper and lead products, but such instances are exceptional. With regard to the tar products market, there is a scarcity of a number of lines in consequence of the reduced operations at the coke-ovens, and prices are steady. Pitch makers are adding only odd lots to the export business already on the books, and interest in carboric acid is quieter than it was some little time ago.

SCOTLAND.—Business generally in the Scottish heavy chemical market remains unchanged with, if anything, a tendency to briskness, and prices on the whole remain steady. In the coal tar product market an unaltered position is reported, prices remaining steady.

General Chemicals

ACETONE.—LONDON: £65 to £68 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 80%, £38 5s. to £40 5s.; pure 80% £39 5s.; tech., 40%, £20 5s. to £21 15s.; tech., 60%, £28 10s. to £30 10s. LONDON: Tech., 80%, £38 5s. to £40 5s.; pure 80%, £39 5s. to £41 5s.; tech., 40%, £20 5s. to £22 5s.; tech., 60%, £29 5s. to £31 5s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £39 5s.; tech. 80%, £38 5s. d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—SCOTLAND: Granulated commercial, £26 10s. per ton; B.P. crystals, £35 10s.; B.P. powder, £36 10s. in 1-cwt. bags d/d free Great Britain in 1-ton lots upwards.

ACID CHROMIC.—10½d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—LONDON: 9½d. per lb.; less 5%. MANCHESTER: 9½d. to 9¾d.

ACID, CRESYLIC.—97/99%, 1s. 1d. to 1s. 7d. per gal.; 98/100%, 1s. 5d. to 2s.

ACID, FORMIC.—LONDON: £47 10s. per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £48; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight,

£53; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works, according to district and quality. SCOTLAND: 80°, £23 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 7s. 6d. to £57 10s. per ton, according to packages and position. SCOTLAND: 98/100%, £49 to £52 ex store. MANCHESTER: £48 to £53 ex store.

ACID, SULPHURIC.—Average prices f.o.r. British makers' works, with slight variations owing to local considerations; 140° Tw. crude acid, £3 per ton; 168° Tw. arsenical £5 10s.; 168° Tw. non-arsenical, £6 15s. SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—LONDON: 11d. per lb. SCOTLAND: B.P. crystals, 11d., carriage paid. MANCHESTER: 11¾d.

ALUM.—SCOTLAND: Lump potash, £9 per ton ex store.

ALUMINA SULPHATE.—LONDON: £8 5s. to £9 10s. per ton. SCOTLAND: £8 to £8 10s. ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHRIMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £32 per ton; powdered, £34, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—£37 to £45 per ton, carriage paid. LONDON: Fine white crystals, £19 to £20. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—SCOTLAND: Spot, £26 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden 6½d. to 1s. 1½d. per lb.; crimson,

1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC.—LONDON: £17 c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £23 ex wharf. MANCHESTER: White powdered Cornish, £22 10s. at mines.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—£11 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot 35/37% £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 15s. in 5/6 cwt. casks.

BORAX, COMMERCIAL.—Granulated, £15 10s. per ton; powder, £17 packed in 1-cwt. bags, carriage paid any station Great Britain. Prices are for 1-ton lots and upwards.

CADMIUM SULPHIDE.—2s. 8d. to 3s.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums.

CARBON BISULPHIDE.—£30 to £32 per ton, drums extra.

CARBON BLACK.—3d. to 4½d.

CARBON TETRACHLORIDE.—£41 to £46 per ton, drums extra.

CHROMIUM OXIDE.—10½d. per lb., according to quantity d/d U.K. Green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 3½d. per lb. Liquor, £19 10s. per ton d/d.

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—LONDON: £4 per cwt.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £28 per ton. SCOTLAND: 40%, £28 ex store.

LAMPBLACK.—£45 to £48 per ton.

LEAD ACETATE.—LONDON: White, £35 per ton; brown, £1 per ton less. SCOTLAND: White crystals, £33 to £35; brown, £1 per ton less. MANCHESTER: White, £31 10s.; brown, £30.

LEAD NITRATE.—£28 per ton.

LEAD, RED.—SCOTLAND: £25 10s. to £28 per ton d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £39 per ton, carriage paid.

LITHOPONE.—30%, £17 10s. to £18 per ton.

MAGNESITE.—SCOTLAND: Ground Calcined £9 per ton ex store.

METHYLATED SPIRIT.—61 O.P. Industrial 1s. 8d. to 2s. 3d. per gal. Pyridinised Industrial, 1s. 10d. to 2s. 5d. Mineralised, 2s. 9d. to 3s. 3d. 64 O.P. 1d. extra in all cases. Prices according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NICKEL AMMONIUM SULPHATE.—£49 per ton d/d.

NICKEL SULPHATE.—£49 per ton d/d.

PHENOL.—9d. to 10d. per lb. nominal.

POTASH, CAUSTIC.—LONDON: £42; MANCHESTER: £41.

POTASSIUM BICHRIMATE.—Crystals and Granular, 5d. per lb. net d/d U.K. Discount according to quantity. Ground 5½d.

LONDON: 5d. per lb. with usual discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 99½/100% powder, £37. MANCHESTER: £37 10s.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM NITRATE.—SCOTLAND: Refined Granulated £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8½d. to 9d. per lb. SCOTLAND: B.P. crystals, 8½d. MANCHESTER: Commercial, 8½d., B.P., 8½d.

POTASSIUM PRUSSIAN.—LONDON: 8½d. to 8¾d. per lb. SCOTLAND: Yellow spot material, 8½d. ex store. MANCHESTER: Yellow, 8½d.

SALAMMONIAC.—First lump spot, £42 17s. 6d. per ton d/d in barrels.

SODA ASH.—58% spot, £5 17s. 6d. per ton f.o.r. in bags, special terms for contracts.

SODA CAUSTIC.—Solid 76/77% spot, £14 5s. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 15s. in casks, Solid 76/77%, £14 10s. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 10s. contracts.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£22 per ton. LONDON: £23.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 10s. ex quay or station. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount according to quantity. Anhydrous, 5d. per lb. LONDON: 4d. per lb. with discounts for quantities. SCOTLAND: 4d. delivered buyer's premises with concession for contracts. MANCHESTER: 4d. less 1 to 3¼% contracts, 4d. spot lots.

SODIUM BISULPHITE POWDER.—60/62%, £16 10s. per ton d/d 1-cwt. iron drums for home trade.

SODIUM CARBONATE (SODA CRYSTALS).—SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality 7s. 6d. per ton extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.—£32 per ton.

SODIUM CHROMATE.—3½d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £15 ex station, 4-ton lots. MANCHESTER: Commercial, £9 5s.; photographic, £15.

SODIUM NITRATE.—LONDON: Spot, £18 to £20 per ton d/d station in drums.

SODIUM PERBORATE.—LONDON: 10d. per lb.

SODIUM PHOSPHATE.—£12 10s. per ton.

SODIUM PRUSSIAN.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5½d. ex store. MANCHESTER: 4½d. to 5½d.

SODIUM SILICATE.—140° Tw. Spot £8 5s. per ton d/d station, returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d. SCOTLAND: English material £3 15s.

SODIUM SULPHATE (SALT CAKE).—Unground Spot, £3 15s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 5s.

SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 2s. 6d. d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8.

SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot, £9 10s. d/d station in bags.

SULPHATE OF COPPER.—MANCHESTER: £16 10s. per ton f.o.b.

SULPHUR.—£11 10s. per ton. SCOTLAND: Flowers, £11; roll, £10 10s.; rock, £9; ground American, £10 ex store.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.

SULPHUR PRECIP.—B.P. £55 to £60 per ton according to quantity. Commercial, £50 to £55.

VERMILION.—Pale or deep, 4s. 3d. to 4s. 5d. per lb.

ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—LONDON AND SCOTLAND: £12 per ton.

ZINC SULPHIDE.—11d. to 1s. per lb.

Pharmaceutical and Fine Chemicals

BISMUTH SALTS.—Carbonate, 7s. 5s. per lb.; Citrate, 10s.; Nitrate (cryst), 5s. 2d.; Oxide, 11s. 7d.; Salicylate, 8s. 4d.; subchloride, 11s. 4d.; subgallate, 7s. 11d.; subnitrate, 6s. 7d.

QUININE SULPHATE.—1s. 11d. per oz.

AMMONIUM IODIDE.—10s. per lb.

IODINE RESUBLIMED.—9s. to 11s. per lb.

IODOFORM.—10s. 9d. to 13s. 7d. per lb.

POTASSIUM IODIDE.—8s. 3d. to 10s. 3d. per lb.

SODIUM IODIDE.—8s. 6d. to 10s. 6d. per lb.

Essential Oils

BERGAMOT.—7s. per lb.

CAMPHOR.—Brown, 65s. per cwt.; White, 95s.

CINNAMON.—Ceylon, 3s. 3d. per lb.

CASSIA.—80/85%, 4s. 3d. per lb.

CLOVE.—90/92%, English, 4s. 3d. per lb.

LEMON.—5s. per lb.

LEMONGRASS.—4s. per lb.

OTTO OF ROSES.—Anatolian, 35s. per oz.; Bulgarian, 50s.

PEPPERMINT.—Japanese, 5s. 3d. per lb.; Wayne County, 13s. 6d.

Coal Tar Products

ACID, CARBOLIC.—Crystals, 9d. to 10d. per lb.; crude, 60's, 2s. 5d. to 2s. 6d. per gal.; 2% water 3s. 0½d. MANCHESTER: Crystals, 9d. per lb.; crude, 2s. 7d. per gal. SCOTLAND: 60's, 2s. 6d. to 2s. 7d.

ACID, CRESYLIC.—90/100%, 1s. 6d. to 1s. 8d. per gal.; pale, 98%, 1s. 4d. to 1s. 5d.; pale 95%, 11d. to 11½d.; dark, 10d., all according to specification; refined, 1s. 8d. to 1s. 9d. LONDON: 98/100%, 1s. 3d.; dark, 95/97%, 11d. SCOTLAND: Pale, 99/100%, 1s. 3d. to 1s. 4d.; 97/99%, 1s. to 1s. 1d.; dark, 97/99%, 11d. to 1s.; high boiling acid, 2s. 6d. to 3s.

ANTHRACENE OIL.—Strained, 4½d. per gal.

BENZOL.—At works, crude, 9d. to 9½d. per gal.; standard motor 1s. 4d. to 1s. 4½d.; 90%, 1s. 5d. to 1s. 6d.; pure, 1s. 7½d. to 1s. 8d. LONDON: Motor, 1s. 6½d. SCOTLAND: Motor, 1s. 6½d. to 1s. 7½d.; 90%, 2s. 0½d. to 2s. 1½d.

CREOSOTE.—B.S.I. Specification standard, 3d. per gal. f.o.r. Home, 3½d. d/d. LONDON: 3d. to 3½d. f.o.r. North; 4d. to 4½d. LONDON. MANCHESTER: 3d. to 4½d. SCOTLAND: Specification oils, 3½d. to 4d.; washed oil, 3½d. to 4d.; light, 3d. to 3½d.; heavy, 4½d. to 5d.

NAPHTHA.—Solvent, 90/160%, 1s. 4d. to 1s. 5d. per gal.; 95/160%, 1s. 8d.; 90/190%, 11d. to 1s. LONDON: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160%, 1s. 3d. to 1s. 3½d.; 90/190%, 11d. to 1s. 2d.

NAPHTHALENE.—Crude, Hot-Pressed, £6 1s. 3d. per ton. Flaked, £10 per ton. Purified crystals, £9 10s. per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 70s. to 75s.

PITCH.—Medium soft, £3 15s. to £4 per ton. MANCHESTER: £3 15s. to £4 f.o.b. LONDON: £3 15s. f.o.b. East Coast part for next season's shipment.

PYRIDINE.—90/140, 4s. 3d. per gal.; 90/180, 2s. to 2s. 6d. SCOTLAND: 90/160%, 4s. to 5s.; 90/220%, 1s. 9d. to 2s. naked.

REFINED COAL TAR.—SCOTLAND: 4d. per gal.

TOLUOL.—90%, 2s. 4d. per gal.; pure, 2s. 9d.

XYLOL.—Commercial, 2s. 2d. to 2s. 3d. per gal.; pure, 2s. 4d.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—Home, £6 15s. per ton; export, £6 7s. 6d. per ton for September shipment f.o.b. U.K. ports in single bags.

NITRO-CHALK.—£7 5s. per ton.

BRITISH NITRATE OF SODA.—£7 8s. 6d. per ton.

CALCIUM CYANAMIDE.—£7 per ton.

CHILEAN NITRATE OF SODA.—£7 8s. 6d. per ton.

CONCENTRATED COMPLETE FERTILISERS.—£10 9s. 6d. to £11 per ton, according to percentage of constituents.

Latest Oil Prices

LONDON, Sept. 13.—LINSEED OIL was firmer. Spot, small quantities, £22 15s.; Sept., £19 15s.; Sept.-Dec., £20 5s.; Jan.-April, £21, naked. RAPE OIL was quiet. Crude extracted, £28; technical, refined, £29 10s., naked, ex wharf. COTTON OIL was quiet. Egyptian, crude, £19 10s.; refined common edible, £21 10s.; deodorised, £23 10s., naked, ex mill. TURPENTINE was steady. American, spot, 48s. 6d. per cwt.

HULL.—LINSEED OIL, spot, quoted £21 per ton; Sept., £20 10s.; Sept.-Dec., £20 15s.; Jan.-April, £21. COTTON OIL, Egyptian, crude, spot, £19 10s.; edible, refined, spot, £21 15s.; deodorised, £23 15s., naked. PALM KERNEL OIL, crude, f.m.q., spot, £17 15s., naked. GROUNDNUT OIL, extracted, spot, £23; deodorised, £27. RAPE OIL, extracted, spot, £27; refined, £28 10s. SOYA OIL, extracted, spot, £20 10s.; deodorised, £23 10s. per ton. COO OIL, 21s. per cwt., nominal. CASTOR OIL, Pharmaceutical, 38s.; first, 33s.; second, 30s. per cwt. TURPENTINE, American, spot, 50s. 6d. per cwt.

Creosote Oil in the United States

CREOSOTE oil imports into the United States showed a considerable decline in the first half of 1933, when, according to preliminary data, incoming shipments aggregated 9,124,934 gal., compared with 18,459,270 gal. during the corresponding period of 1932. The United Kingdom supplied a third of the United States imports during the first half of 1933.

Inventions in the Chemical Industry

Specifications Accepted and Applications for Patents

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Specifications Accepted with Dates of Application

AZO DYESTUFFS.—Imperial Chemical Industries, Ltd., and C. Paine. Nov. 26, 1931. 397,879.
PROCESSES AND APPARATUS FOR WASHING GAS.—R. R. Harmon and Peabody Engineering Corporation. Jan. 22, 1932. 397,862.
MANUFACTURE OF CYCLOHEXYL-CYCLOHEXANOL AND HOMOLOGUES THEREOF.—Howards and Sons, Ltd., J. W. Blagden and G. C. H. Clark. Feb. 1, 1932. 397,883.
REDUCTION OF AROMATIC HYDROXY COMPOUNDS.—J. Y. Johnson (I. G. Farbenindustrie). Feb. 27, 1932. 397,901.
PURIFICATION AND DECOLORISATION OF PHENOLS AND NEUTRAL OILS.—G. T. Morgan and A. E. J. Pettet. Feb. 29, 1932. 397,847.
PURIFICATION OF GASES DERIVED FROM ROASTING PROCESSES.—I. G. Farbenindustrie. May 1, 1931. 397,851.
CARRYING OUT OF CHEMICAL REACTIONS WITH CARBON MONOXIDE.—E. I. Du Pont de Nemours and Co. Feb. 28, 1931. 397,852.
MANUFACTURE OF CELLULOSE ESTERS.—Kodak, Ltd. March 4, 1931. 397,906.
PROCESS FOR MAKING RESINOUS PRODUCTS BY CONDENSING ALDEHYDES WITH OTHER COMPOUNDS SUCH AS UREA OR PHENOL.—I. Feinmann. March 2, 1932. 397,909.
STABILISATION OF CHLORINATED HYDROCARBONS.—Roessler and Hasslacher Chemical Co. March 3, 1931. 397,914-5.
HYDROGENATION OF CARBOXYLIC ACIDS.—E. I. Du Pont de Nemours and Co. March 5, 1931. 397,938.
MANUFACTURE AND PRODUCTION OF ACETYLENE CHLORIDES.—J. Y. Johnson (I. G. Farbenindustrie). April 22, 1932. 397,961.
MANUFACTURE AND PRODUCTION OF ACETYLENE FROM GASES CONTAINING HYDROCARBONS.—J. Y. Johnson (I. G. Farbenindustrie). May 30, 1932. 397,987.
PROCESS FOR THE MANUFACTURE OF COMPLEX DOUBLE COMPOUNDS OF ORGANIC HEAVY METAL MERCAPTO COMPOUNDS.—Schering-Kahlbaum Akt.-Ges. Nov. 7, 1931. 398,020.
PRODUCTION OF LUBRICATING OILS, KEROSENE, AND OTHER HYDROCARBONS FOR PETROLEUM STOCKS BY TREATMENT WITH ALUMINIUM CHLORIDE.—Gulf Refining Co. March 10, 1932. 398,032.
METHOD OF DESULPHURISING COAL DISTILLATION GASES.—Gewerkschaft M. Stinnes. Oct. 23, 1931. 398,047.
MANUFACTURE OF INTERMEDIATE PRODUCTS AND DYESTUFFS.—Soc. of Chemical Industry in Basle. Nov. 21, 1931. 398,053.
PROCESS FOR THE MANUFACTURE OF MIXED ANHYDRIDES OF BORIC ACID AND ORGANIC ACIDS.—Henkel et Cie, Ges. Dec. 23, 1931. 398,064.
MANUFACTURE OF SULPHONIC ACIDS OF THE TERPENE SERIES.—Soc. of Chemical Industry in Basle. Jan. 21, 1932. 398,086.
PROCESS FOR THE MANUFACTURE OF CC-PHENYL-ETHYL-N-N-PROPYL-BARBITURIC ACID.—F. Hoffmann-La Roche and Co. Akt.-Ges. June 30, 1932. 398,132.

Applications for Patents

DETERMINING CONCENTRATION OF HYDROGEN IONS.—Dr. N. Gerber's Co. Sept. 2. 24418, 24419, 24420.
RECOVERY OF ETHYLENE, ETC., FROM GASES.—G. F. Horsley and Imperial Chemical Industries, Ltd. Sept. 1. 24284.
PIGMENTS CONTAINING LEAD PHOSPHATES, ETC.—H. Hunsdiecker. Sept. 1. 24305.
MANUFACTURE OF 4-AMINODIPHENYLAMINE DERIVATIVES.—I. G. Farbenindustrie. Aug. 29. (Germany, Aug. 31, '32.) 23943.
PRINTING WITH VAT DYESTUFFS, ETC.—I. G. Farbenindustrie. Sept. 1. (Germany, Sept. 1, '32.) 24298.
MANUFACTURE OF CHLORINATED RUBBER.—Imperial Chemical Industries, Ltd. Aug. 29. 23931.
MANUFACTURE OF SODIUM OXALATE.—Imperial Chemical Industries, Ltd., and W. R. Madel. Aug. 30. 24056.
MANUFACTURE OF SAFETY EXPLOSIVES.—Imperial Chemical Industries, Ltd., and R. C. Paine. Aug. 30. 24072.
PRODUCTION OF FUEL BY LOW-TEMPERATURE CARBONISATION OF COAL.—G. S. Jenkins. Sept. 1. 24269.
IMPROVING PROPERTIES OF SYNTHETIC TANNING AGENTS.—J. Y. Johnson (I. G. Farbenindustrie). Aug. 28. 23836.
WORKING UP SOLUTIONS WHICH CONTAIN HYDROCHLORIC ACID, ETC.—J. Y. Johnson (I. G. Farbenindustrie). Aug. 30. 34046.
SULPHATING NON-FERROUS METALS CONTAINED IN PYRITES, ETC.—Metallges A.-G. Aug. 28. (Germany, Dec. 30, '32.) 23865.
SULPHATING NON-FERROUS METALS CONTAINED IN FERRUGINOUS SULPHIDE ORES, ETC.—Metallges A.-G. Aug. 29. 23958.
PYROLYTIC CONVERSION AND COKING OF MIXTURES OF FINELY-DIVIDED SOLID CARBONACEOUS MATERIAL AND HYDROCARBON OIL.—A. L. Mond (Universal Oil Products Co.). Aug. 29. 23959.
HALOGENATION OF ORGANIC FLUIDS.—N. V. De Bataafsche Petro-

leum Maatschappij. Aug. 29. (United States, Sept. 6, '32.) 23984.
MAKING NON-TOXIC COMPOUNDS OF ARSENOBENZENE, ETC.—S. Pozowski. Aug. 29. 23928.
MANUFACTURE OF ANTHRAQUINONE DYESTUFFS.—Soc. of Chemical Industry in Basle. Sept. 2. (Switzerland, Sept. 15, '32.) 24391.
PURIFICATION OF SILICA SANDS, ETC.—F. W. Adams. Sept. 5. 24596.
ALLUMINIUM BASE ALLOYS.—Aluminium, Ltd. Sept. 7. 24860, 24861, 24862, 24863.
PRODUCTION OF ORGANIC SALTS OF CALCIUM.—Boot's Pure Drug Co., Ltd., and F. L. Pyman. Sept. 5. 24612.
PREPARATIONS FOR ERADICATING WEEDS.—Chemische Fabrik L. Meyer. Sept. 8. (Germany, Sept. 8, '32.) 24934.
MANUFACTURE OF ZINC WHITE.—H. E. Coley. Sept. 9. 25016.
OBTAINING KRYPTON AND XENON FROM AIR.—Ges. für Linde's Eismaschinen A.-G. Sept. 7. (Germany, Sept. 8, '32.) 24841.
MANUFACTURE OF BASIC TRIPHENYLMETHANE DYESTUFFS.—I. G. Farbenindustrie. Sept. 4. (Germany, Sept. 3, '32.) 24473.
MANUFACTURE OF SYMMETRICAL DI-(ARYLAMINO)-HYDROXYBENZENES.—I. G. Farbenindustrie. Sept. 4. (Germany, Sept. 3, '32.) 24474.
MANUFACTURE OF MONOAZO DYESTUFFS.—I. G. Farbenindustrie. Sept. 4. 24475, 24476, 24477, 24478.
MANUFACTURE OF AZO DYESTUFFS.—I. G. Farbenindustrie. Sept. 8. (Germany, Sept. 9, '32.) 24933.
MANUFACTURE OF WATER-INSOLUBLE AZO DYESTUFFS, ETC.—I. G. Farbenindustrie. Sept. 8. 24938, 24939, 24940, 24941, 24942.
MANUFACTURE OF AZO DYESTUFFS INSOLUBLE IN WATER.—I. G. Farbenindustrie. Sept. 9. 25026, 25027.
ANTHRAQUINONE DERIVATIVES.—Imperial Chemical Industries, Ltd., and F. Lodge. Sept. 6. (March 4.) 24732.
MANUFACTURE OF DISAZO DYESTUFFS.—J. Y. Johnson (I. G. Farbenindustrie). Sept. 6. 24719.
PRODUCTION OF ORGANIC SALTS OF CALCIUM.—H. H. L. Levene. Sept. 5. 24612.
MANUFACTURE OF ACETIC ACID FROM ALCOHOL.—Usines de Melle. Sept. 4. (France, Sept. 16, '32.) 24484.
METHOD OF KEEPING IN CONDITION FOR USE PELLICLES OF REGENERATE CELLULOSE.—Viscose Development Co., Ltd. Sept. 7. (United States, Oct. 13, '32.) 24818.

Complete Specifications Open to Public Inspection

PRODUCTION OF ALKALI THIOCYANATES, ALKALI FERROCYNANIDES, OR PRUSSIAN BLUE.—E. Hene. March 3, 1932. 36117/32.
PROCESS FOR DYEING VISCOSE ARTIFICIAL SILK PIECE-GOODS.—Soc. of Chemical Industry in Basle. March 2, 1932. 5555/33.
PROCESS FOR THE MANUFACTURE OF BORNYL OXALATES.—L. Darrasse, E. Darrasse, L. Dupont, and E. Elöd. Feb. 29, 1932. 6031/33.
MANUFACTURE OF SULPHONATION PRODUCTS OF ALIPHATIC CARBINOLS.—I. G. Farbenindustrie. Feb. 29, 1932. 6113/33.
MANUFACTURE OF A MONOAZO DYESTUFF ON THE FIBRE.—I. G. Farbenindustrie. Feb. 29, 1932. 6114/33.
PROCESS FOR THE MANUFACTURE OF REACTION PRODUCTS.—I. G. Farbenindustrie. Feb. 29, 1932. 6144/33.
MANUFACTURE OF NUCLEAR SUBSTITUTION PRODUCTS OF ACENAPHTHALIC ACID AND 1:4:5:8-NAPHTHALENETETRA-CARBOXYLIC ACID.—I. G. Farbenindustrie. March 2, 1932. 6374/33.
PROCESS FOR THE MANUFACTURE OF REACTION PRODUCTS.—I. G. Farbenindustrie. March 2, 1932. 6437/33.
MANUFACTURE OF REACTION PRODUCTS FROM NATURAL OR SYNTHETIC WAXES OF THE ESTER TYPE.—I. G. Farbenindustrie. March 3, 1932. 6541/33.
PROCESS FOR THE MANUFACTURE OF ACID AMIDE DERIVATIVES.—I. G. Farbenindustrie. Feb. 29, 1932. 21744/33.

Books Received

City of Birmingham. Annual Report of the City Analyst for the year 1932. By H. H. Bagnall.

Official Publications

Economic Conditions in Canada 1932-33. Report by F. W. Field. Department of Overseas Trade. London: H.M. Stationery Office. Pp. 181. 5s.
Economic and Manufacturing Aspects of the Building Brick Industries. Department of Scientific and Industrial Research. Building Research Special Report No. 20. London: H.M. Stationery Office. Pp. 112. 2s.

From Week to Week

DUNFERMLINE TOWN COUNCIL has asked the local M.P. to take up with the Admiralty the question of converting Rosyth Dockyard into a coal refinery.

AN EXHIBITION of the products of Scottish Oils, Ltd., and Shell-Mex, Ltd., was opened last week at the Glasgow Showrooms of the Glasgow and District Development Board.

BOOTS PURE DRUG CO., LTD., has announced the appointment of Viscount Mersey, Viscount Wolmer and Colonel F. P. Braithwaite as additional directors. The board has also passed a resolution convening a meeting to divide the ordinary shares (£1) into shares of 5s. each.

GERMAN OIL INTERESTS have submitted a programme to the Government aiming at an increase of the home produced product in order to check imports. It is stated that the proposals include between 200 and 300 new borings, which would mean an expenditure of about £2,500,000 at the par rate of exchange.

MR. CLARENCE R. WILKINSON, Bradford, has gained the first place in the United Kingdom in the final dyeing examinations of City and Guilds of London Institute. He has also received prizes offered by the Dyers' Company, and is now employed in the laboratory of Lister and Co., Ltd., Bradford.

THE MARRIAGE TOOK PLACE on September 9, at Menston, Yorks, of Mr. Walter Garner, Bradford, and Miss Irene M. Gilbank, Burley-in-Wharfedale. Mr. Garner is chief chemist of Lister and Co., Ltd., textile manufacturers, Manningham Mills, Bradford, and is a member of the publication committee and fastness tests committee of the Society of Dyers and Colourists.

SHEFFIELD UNIVERSITY has been presented with a cheque for £5,000 by Sir Robert Hadfield, chairman of Hadfields, Ltd., to commemorate the second visit of the Iron and Steel Institute to the city. He was president of the Institute at the time of its last visit in 1905; the present meeting, which opened on September 12, was presided over by Mr. R. W. Lysaght. Sir Robert has left the University to decide how the money shall be spent, but would prefer it to be used on furthering metallurgical research.

HALIBUT LIVER OIL, at one time regarded as useless, has been proved to have a high vitamin content, and this knowledge has decided fishing interests in British Columbia to market halibut livers. Last year 2,200 cwt. was disposed of and it is hoped that the trade will develop quickly and be able to compete successfully with the cod liver trade on the Atlantic coast. Some fishermen in British Columbia are also placing cod liver on the market.

THE INAUGURATION of a CHEMICAL TECHNOLOGY course in the Indian Institute of Science, says the August number of "Current Science," marks a distinct step in the progress of technical education in India. The course is intended to train graduates from universities in industrial chemistry. Our contemporary further states that the need for such trained men in the country is great, and no doubt will be greater in the future when the development of Indian industry will become part of the task of national reconstruction. An announcement of the creation of the course was made in THE CHEMICAL AGE of August 5.

SEVERAL UNITED STATES CONCERNS have signed the President's N.R.A. blanket code for the chemical industry. E. I. du Pont de Nemours and Co. has increased the pay of 650 workers in Wilmington, having previously announced increases of about 5 per cent. for 13,000 workers in various States. The Hercules Powder Co. has reduced working hours and thus given extra employment to 400 men. Wage adjustments have been made to balance the shorter hours. The Union Carbide and Carbon Corporation has signed the code, affecting 8,180 employees, and the Viscose Corporation has placed employees on a 40-hour week basis, increasing wage rates by 20 per cent. This arrangement has made possible an increase in the staff of about 200 men.

THE FRENCH CONGRESS OF INDUSTRIAL CHEMISTRY opens at Lille on September 24, and will continue until the end of that week. The work of the Congress is divided into six groups, namely, works and laboratories, fuels, metallurgy, and the mineral industries, organic products, agricultural industries and economic organisation. A number of lectures will be delivered, among which are "The Modern Trend in Iron and Steel Metallurgy," by Professor A. Portevin; "Corrosion and the Protection of Metals," by Dr. U. R. Evans; "Application of the X-Rays to the Study of the Molecular Structure of Wool and other Animal Fibres," by Professor W. T. Astbury, of Leeds University; and "Recent Factors in the Evolution of the Thermal Metallurgy of Zinc," by Professor O. Dony-Henault, of Brussels. The whole of Friday and Saturday, September 29 and 30, will be spent in visits to Dunkirk, Douai, Roubaix, Tourcoing, Armentières, Ypres, Bruges, and other centres. An official banquet at the Hotel Metropole, Place de Brouekere, Brussels, will terminate the proceedings. Details may be obtained from the Société de Chimie Industrielle, 49 rue de Mathurias, Paris, 8e.

THE DEATH occurred at Wigton last week, while home on holiday, of Mr. John McKechnie (51), manager of Imperial Chemical Industries, Ltd., at Durban. He fell dead at the wheel of his car.

THE DEATH OCCURRED at Windermere, on September 6, of Mr. Edmund Peel Potter, aged 86. He was the founder of the chemical manufacturing firm of E. P. Potter and Co., Ltd., Bolton, and was a great benefactor to local charitable institutions.

A SUBSIDIARY COMPANY of Kirkless, Tottington, Lancs., and Greenhalgh and Shaw, Bolton, has acquired a disused cotton-spinning mill at Bolton, where it is intended to carry on the manufacture of rayon. Electrically-driven machinery is being installed.

WE REGRET TO ANNOUNCE THE DEATH, at the age of 63, of Sir Gilbert Vyle, managing director of W. and T. Avery, Ltd., Birmingham, and a member of the Overseas Trade Development Council. Changes and additions to the personnel of the Council were announced only last month.

NOTICE WAS GIVEN in the "London Gazette" on September 8 of the voluntary winding-up of Silica Supplies, Ltd. At a meeting of the company on August 26, Mr. A. S. Sinclair, of 406 Mansion House Chambers, 11 Queen Victoria Street, E.C.4, was appointed liquidator.

MR. ARTHUR SHAW, secretary of the federation of unions in the bleaching, dyeing, finishing, and calico printing trades, stated on Wednesday that the Allied Association of Bleachers, Dyers, Printers, and Finishers had written suggesting that a joint meeting be held in Manchester on September 25 to discuss the unions' application in respect of wages and working hours.

MR. C. F. R. BROTHERTON and Miss Isabel Worsley were married in London on September 7. Mr. Brotherton is chairman of Brotherton and Co., Ltd., manufacturers of ammonia and sulphuric acid, in which position he succeeded his uncle, the late Lord Brotherton. He celebrated the occasion by giving an additional week's wages to all employees of the firm, at Leeds, Wakefield, Birmingham, Liverpool and Glasgow.

MORE THAN 1,300 TONS OF KELP has recently been shipped from Pullagheeny, County Sligo, to the Galway iodine factory. The average price for kelp in the Free State recently has been £4 4s. 3d., as compared with £7 17s. 4d. per ton last year, the drop being attributed to the fall in the world price of iodine. Complaints are being made in some of the kelp-gathering districts against the tests for iodine content of the weed, which are made by Free State Government inspectors.

CERTAIN GERMAN FIRMS have secured contracts to supply the machinery for six sugar beet factories in Persia. Another new industrial project in Persia is cotton spinning, and it is stated that a Lancashire firm has booked orders for three mills. The complete installation will include bleaching, dyeing and finishing plant, and water-softening apparatus will be required. Full particulars of the scheme may be had from the Persian Consulate, 100 Portland Street, Manchester.

RECENT WILLS INCLUDE THE FOLLOWING:—Thomas Henry Elvin, of Hull, chairman of Elvin Bros., oil and soap manufacturers, Hull, £9,367 (net personalty, £1,143); Joseph Plant, of Handsworth, managing director of Hudson's Soap Manufacturers (now Lever Bros.), £96,184 (net personalty £94,773); and William John Livingston, Stoke Newington, late of the chemistry department of the London County Council, £13,539 (net personalty £13,394).

PLANS ARE BEING MADE for the building of a giant new chemical-metallurgical combine in the Central Urals, near Sverdlovsk. The technical plan for the copper-flotation works has already been approved. The approximate cost of the copper section of the combine is 25 million roubles. The building of the chemical works of the combine is to be commenced by the spring of 1934. It is designed for an output capacity of 440,000 tons of sulphuric acid and 220,000 tons of superphosphates. The estimated cost of the whole combine is approximately 325 million roubles.

LORD EGLIN, Sir Francis Goodenough, and Sir Felix Pole have joined the directorate of British Industries House. The building in which British Industries House is being established was formerly known as Gamages (West End), Marble Arch, London, and is to be opened shortly as a permanent buying centre for British goods. The Buyers' Association of Great Britain has decided to make British Industries House its headquarters from September 29. The Scottish National Development Council, of which Sir James Lithgow, Bart., is chairman, has already given its support to British Industries House, and the Department of Overseas Trade has promised that when the scheme receives the general support of the trading and industrial community, it will supply information about it to inquirers at the offices of H.M. Commercial Diplomatic Officers, Trade Commissioners and Consular Officers. British Industries House is to be reserved exclusively for home and overseas buyers and British manufacturers.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Hungary.—A report on the markets for drugs and patent medicines in Hungary, based on information received from the Commercial Secretary to The British Legation at Budapest, has been issued by the Department of Overseas Trade to firms whose names are entered on its Special Register. (Ref. F.Y. 1853.)

Jamaica.—A firm of merchants and commission agents in Kingston desire to obtain the representation of United Kingdom manufacturers of asbestos cement and asbestos sheeting on a purchasing and/or commission basis. (Ref. No. 285.)

South Africa.—The Senior British Trade Commissioner in South Africa reports that the South African Railways and Harbours Administration is calling for tenders, to be presented in Johannesburg by November 6, 1933, for the supply of approximately 203,300 lb. of carbide of calcium to British Acetylene and Welding Association's standard. (Ref. F.Y. 1858.)

Argentina.—The Commercial Counsellor to H.M. Embassy at Buenos Aires reports that the Argentina State oilfields are calling for tenders to be presented in Buenos Aires by October 3, for the supply of 23,392 kilos of anti-corrosive paint in various colours suitable for outdoor ironwork, and for 3,610 kilos of boiled linseed oil. (Ref. BY 7657.)

Company News

Indestructible Paint Co.—An interim dividend of 5 per cent. is announced on the ordinary shares.

United Glass Bottle Manufacturers, Ltd.—An interim dividend of 2½ per cent. is announced on the ordinary shares, payable on September 18.

Canadian Celanese, Ltd.—The directors have declared a dividend of \$1.75 per share on the 7 per cent. cumulative participating preferred stock for the three months to September 30, payable on that date.

United Indigo and Chemical Co.—The net profit for the year to June 30 last amounts to £7,539, and the available balance is £22,110. After payment of the ordinary dividend of 5 per cent., less tax, there remains £13,485 to be carried forward.

German Potash Syndicate.—It is announced that in carrying out the operation of the sinking fund for the period ending October 31, 1933, bonds amounting to £132,840 of series "A" and £66,970 of series "B" of the Syndicate have been purchased and cancelled.

Celanese Corporation of America.—A quarterly dividend of \$1.75 per share has been declared on the 7 per cent. cumulative series prior preferred stock, payable on October 1. A dividend of \$1 per share has also been declared on the 7 per cent. cumulative first participating preferred stock, payable on September 30.

SULPHURIC

ALL STRENGTHS

Hydrochloric, Nitric, Dipping, Hydrofluoric,
Lactic, Perchloric

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Tata Iron and Steel Co.—The accounts for the year ended March 31 show a net profit of Rs.39,84,596, after providing Rs.82,00,000 for depreciation. The full dividend on the first preference shares is being paid and 5 per cent. is being distributed on the 7½ per cent. second preference shares. These payments absorb Rs.39,18,785, and the balance of Rs.61,964 is to be carried forward.

Calico Printers' Association, Ltd.—The report for the year to June 30 last states that the net profits after depreciation and maintenance are shown at £123,926, against £157,458 a year ago. The sum of £50,000 is transferred from general reserve and after payment of the preference dividend the carry-forward is increased from £10,475 to £33,596. No payment is made on the £2,010,736 ordinary stock, the last distribution being 5 per cent. for 1928-29. The annual meeting will be held at Albert Hall, Peter Street, Manchester, on September 20, at 11 a.m.

New Companies Registered

Sprakar Products, Ltd. Registered September 7. Nominal capital £1,000 in £1 shares. To acquire the business of manufacturers of and dealers in the disinfectant and germicide known as "Sprakar" carried on by J. Gadd (Colour and Chemical Agencies), Ltd., at 126 Bishopsgate, E.C.2, together with the benefit of the trade mark "Sprakar." Subscribers: R. G. Browning, 89 Cranfield Road, S.E.1; E. J. Clarke, A. J. Edwards and Thomas Tait.

Tintex Dyes, Ltd. 252-260 Regent Street, W.1. Registered August 28. Nominal capital £1,000 in 2s. shares. To acquire the business of British Tintex and Dye Products, Ltd., including the trade mark "Tintex," and to carry on the business of manufacturers of and dealers in dyes, dyestuffs, chemical drugs, paints, varnishes, colours, industrial, pharmaceutical and other preparations, etc. Subscribers: L. E. Skan, 4 Copthall Chambers, E.C.2., Harold E. Skan and five others.

Vemol Products, Ltd. 1a Wood Street, Cheapside, E.C.2. Registered August 24. Nominal capital £100 in £1 shares. To adopt an agreement with V. G. Pears, M. Bader and E. Bader, and to carry on the business of manufacturers of and dealers in motor greases, oils, lubricants, varnishes, paints, polishes, driers, pigments, oleaginous substances, waxes, fats, etc. Directors: M. Bader, 24 Derwent Road, Palmers Green, N.13. E. Bader, V. G. Pears.

Forthcoming Events

Sept. 22.—Institute of the Plastics Industry (Midland Section). "Plastics—Since 1905. Some Personal Reflections." Wm. C. Waghorne. Imperial Hotel, Temple Street, Birmingham.

Sept. 28.—Institute of Fuel. Visit to Battersea and Barking new Power Stations.

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